

## President Boileau Discusses Spare Parts Issues; "Hot Lines" Established for Company Employees

Dear Fellow Employee:

Many of us have been approached by friends and acquaintances who are very disturbed by the recent news stories alleging that the defense industry — and General Dynamics in particular — is "gouging" the U.S. Government and the taxpayer for spares and support equipment for weapon systems.

Unfortunately, they have reason to be upset, even though the news articles, almost without exception, are extremely simplistic and misleading accounts of a very complex subject. The problem is that when we examine these "horror stories" in detail, we find that we have been less than diligent in some cases. Although in most cases we followed established and approved procedures, when viewed in hindsight some of our actions don't look very smart.

In some instances, the part alone is not what is being purchased. Many times, instruction manuals and their demonstration — along with the part and the weapon system — are purchased within the part's cost that you have seen referenced in the news articles.

Also, the prices which you have seen quoted are determined by a pricing formula, standard in the industry, which allocates or assigns all of the "cost elements" in a given order equally among the parts in that order. These cost elements include engineering, packaging, inspection, labor, overhead,

product support and other charges. As you might expect, use of this formula distorts the price of a small, low-value part in an order far out of proportion to the intrinsic value or cost of the item. On the other hand, this formula reduces the "price" for more complex, high-value items.

The alternative to this method of pricing is to allocate the costs of the whole package among every single item in proportion to the cost of each part. With hundreds of thousands of parts involved, the increased activity would be overwhelming and not cost-effective.

There are other complicating factors. Because of annual budget constraints, the Government too often buys parts in small, uneconomical quantities. The Government and industry are working very hard to correct this practice. Finally, with industry filling millions of parts orders each year, it can be expected that mistakes will occur.

Our company is taking the lead to bring about the reforms which everyone agrees need to be made in the procurement system. But we need to do more and we need your help. We need to use more good judgment and common sense in pricing spare parts and support equipment. If anyone involved in the spares and support activity thinks a price looks out of line, we need to know about it so we can take corrective action immediately or challenge the system and call it to the attention of

the customer. You should bring this to the attention of your supervisor or call the company's new "Spare Parts Hot-lines" that have been set up for employees, as follows:

Convair - 573-5946; George W. Roos, Director Integrated Logistic Support

Electric Boat - 446-3435; A. J. Gigliotti, Manager Industrial Sales and Service

Electronics - 573-7164; Carl D. Nelson, Director Product Support

Fort Worth - 777-2777; Rolf Krueger, Vice President Logistics and Support

Land Systems - 978-5639; R. G. Hill, Director Logistics and Support  
Pomona - 620-7511, x3338; Charles E. Reno, Director Product Support and Applications.

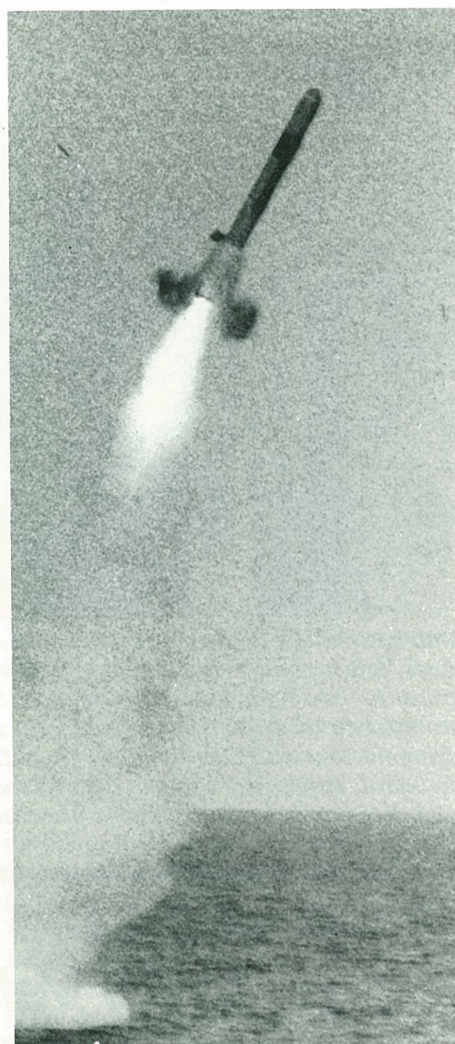
You may also call the following Hotline number at Corporate Headquarters in St. Louis - (314) 889-8796; E. C. Gray, Director - Material.

You may be sure they will be supportive.

Again, we need your help. Our company has a long-standing policy of providing the best quality product at the lowest possible price, and this will always be our goal.



O. C. Boileau  
President



Cruise Missile Flight Begins

## Vertical Launch Tomahawk Flies Successful Test

A Convair-built Tomahawk Cruise Missile was successfully tested recently from a vertical launch system designed for use on SSN 688-class submarines.

All test objectives were met in the test which began as the Tomahawk was launched using a Capsule Launching Subsystem mounted on a submerged device designed to simulate a moving submarine. Following launch, the missile successfully transitioned from vertical to cruise flight. The Tomahawk flew a preplanned route over the Pacific Missile Test Center's Sea Test Range and was recovered at San Clemente Island, Calif., using its parachute system.

The test was part of a development program for deploying Tomahawks in a vertical launch system on newly constructed 688-class attack submarines, which will be fitted with 12 Tomahawk vertical launch tubes in the forward main ballast tanks.

## Commercial Atlas/Centaur Approved by NASA

The National Aeronautics and Space Administration has selected General Dynamics/Convair to operate the commercial Atlas/Centaur program, subject to negotiation of a formal agreement.

Under the program, Convair, using its own resources, will build Atlas/Centaur vehicles, solicit commercial payloads, such as communications satellites, and provide launch services.

David S. Lewis, Chairman and Chief Executive Officer, said that the company "was very pleased with NASA's decision to allow and support commercial use of the Atlas/Centaur launch vehicle for placing commercial satellites in orbit."

"The highly reliable Atlas/Centaur system has an outstanding record of successfully placing satellite systems in operational orbits over the past decade," Lewis said. "The company believes the decision announced by NASA on December 16th opens up the opportunity for this American system to compete with the European

government-supported Ariane system for commercial satellite launch business over the next decade."

Previous to its selection of Convair in this commercial space program, NASA had contracted for construction of the rockets and launched commercial satellites for a fee. NASA ultimately will cease Atlas/Centaur launches of commercial satellites, and this action will be turned over to Convair.

Secretary of Transportation Elizabeth Hanford Dole said that her department was pleased with the NASA decision. She said that NASA's action reflects the government's "strong and responsive commitment" to commercial space applications, and she called General Dynamics' proposal a "positive indication" of private sector confidence in the commercial satellite market.

"This is the beginning of what could become a \$10 billion industry over the next decade," Secretary Dole said. "Commer-

cial satellites have immense potential for improving life in America and the world. I want to assure that government does all it can to aid the natural development of this exciting new industry."

NASA said it will begin negotiation of a formal agreement with Convair this month. Convair proposes to begin marketing and production early this year and to institute complete launch services in 1987 after the last government launch.

NASA said its selection of Convair to operate the Atlas/Centaur program sup-

*Continued on Page 4*

## GD Wins Important Contracts

### \$63.8 Million to EB For UK Trident Design

Electric Boat has been awarded a \$63.8-million cost plus fixed-fee contract for design services for the United Kingdom's Trident II (D-5) ballistic missile submarine.

The contract, which will be administered by the U.S. Navy's Naval Sea Systems Command, calls for detail design work on the project, which began in 1981.

### Convair Wins Study For Small ICBM

General Dynamics has been awarded a \$5-million contract from the U.S. Air Force's Ballistic Missile Office for concept definition studies of the new Small Intercontinental Ballistic Missile.

Convair was one of four companies selected for studies of the total weapon systems definition. The new missile will be deployed on hardened mobile launchers, with an option for deployment in silos.

These initial studies are to be completed by the fall of 1984, at which time the Air Force plans to select two of the contractors for a preliminary full-scale engineering development phase for the missile system.

### Dispenser System Award to Convair

Convair has been awarded a \$30.8-million contract for full-scale engineering development of a submunitions dispenser system to be used with the Tomahawk Sea Launched Cruise Missile.

The dispenser will allow various submunitions to be used with the cruise missile, giving it a multitarget capability.

According to the Joint Cruise Missiles Project Office, which is managing the program for the U.S. Navy, deployment of Tomahawk missiles with the dispenser will begin in 1987. This variant could be used against unhardened structures, such as radar sites, and aircraft on the ground.

### Approved Funding For 75 Israeli F-16s

Fort Worth was notified in late December by the U.S. Air Force that \$202.4 million in long lead funding has been approved to cover work performed through August of 1984 in support of Israel's follow-on purchase of 75 F-16C/D fighter aircraft.

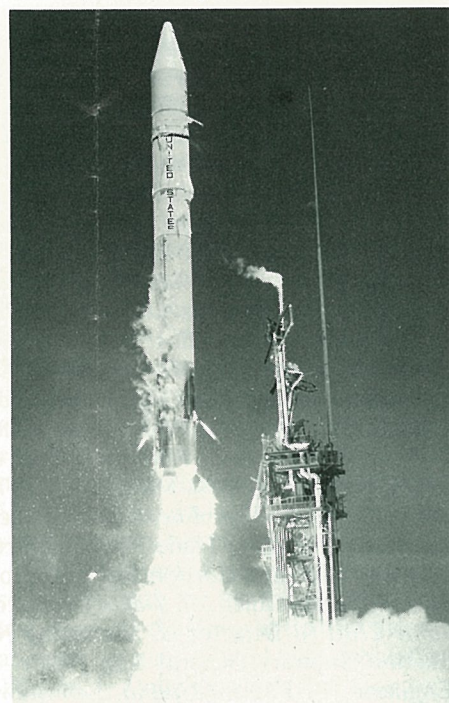
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## Fourth Trident Delivered by EB 44 Days Early

USS *Georgia* (SSBN 729), the nation's fourth Trident missile-firing submarine, was delivered by Electric Boat to the Navy on January 17th, 44 days ahead of schedule.

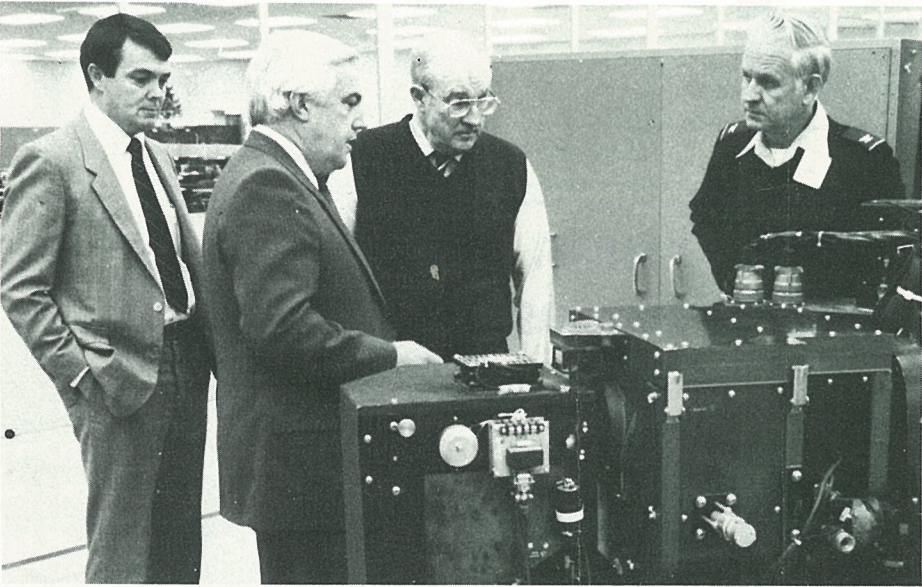
The 560-foot, 18,750-ton *Georgia* is the sixth submarine in a row that Electric Boat has delivered ahead of schedule.

The *Georgia* is scheduled to join the fleet during commissioning ceremonies February 11th at the Naval Underwater Systems Center in New London, Conn. Senator Mack Mattingly of Georgia and Adm. James D. Watkins, Chief of Naval Operations, will be the principal speakers. Senator Mattingly is Chairman of the Senate Subcommittee on Military Construction.



Atlas/Centaur





**Important Visit.** Under Secretary of the Army James R. Ambrose toured Pomona's East Valley plant recently and was given a review of Stinger-POST production transition and basic Stinger production. Shown above, looking at an environmental test station for the Stinger guidance section, from left are Dave McPherson, Pomona Vice President and Program Director of Stinger Weapon Systems; Bill Leonard, Director of Stinger-POST Production Program; Secretary Ambrose and Col. Robert Thomson, Senior Representative of the Army Missile Command Field Office at Pomona.

# Advanced Land Systems Studies Integrate All Vehicle Electronics

By Jack Price

One Land Systems engineering laboratory is delving into areas so advanced that a new word — "vetronics" — had to be coined to describe what it is doing.

"The term vetronics is derived from vehicle electronics and involves the integration of all the various vehicle electronic subsystems into a smoothly operating system," said Dennis Bielawski, Manager of the Vetronics Laboratory. "The concept is not new — consider 'avionics,' for example — but its application to land combat vehicles is."

The need for vetronics arises out of the increasing sophistication and complexity in electronics and weapons systems in future land combat vehicles, Bielawski said. "The latest in technology must be incorporated in these vehicles in the most efficient and economical means and in a manner that keeps all subsystems operating together. At the same time, the equipment must be manageable by tank crewmen."

A little more than a year in existence, the Vetronics Laboratory is conducting a wide variety of investigations into future technology. Three major thrusts of the Vetronics Laboratory deal with multifunction controls and displays, structured electrical/electronic system integration for combat vehicles and integrated battlefield communications and defense systems.

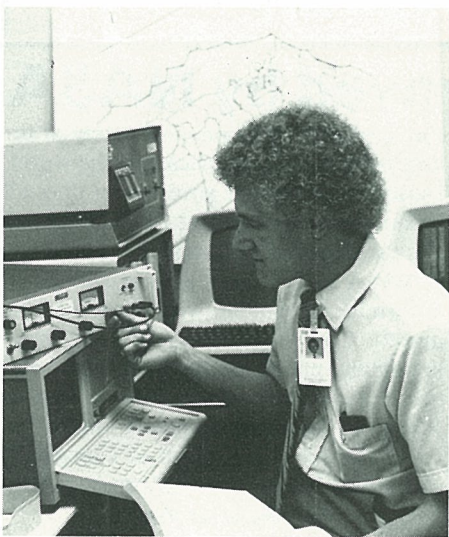
"The concept of a multifunction display offers a new approach to instruments and control panels," said Robert Hoffman, Project Technician. "A solid flat-panel display replaces conventional instrument readouts of pressure, temperature and vehicle functions. Text messages alert the operator when conditions exceed safe limits. The operator can control selected vehicle functions with only a few push-buttons instead of the conventional array of individual switches and lights."

The flat-panel display can also be used for graphic or video presentations and can provide built-in self-test capability to improve maintainability. "Future plans call for extending this concept in areas of crew training, maintenance instruction and fault isolation," Hoffman said.

A second thrust of the Vetronics Laboratory concerns the development of a

structured and integrated electronic system that will be standard for combat vehicles.

The third area of investigation by the Vetronics Laboratory is a communication link that provides an automatic flow of information among command and control posts, resupply stations, intelligence stations and combat vehicles. Such a link will relay a need for fuel, ammunition or spare parts to a supply station or automatically transmit battlefield data — including threat and target information — to command posts, intelligence sources and the vehicles.



**Advanced Work.** Gregory Dorr, Design and Development Engineer at the Land Systems Vetronics Laboratory, tests the power supply sensitivity of circuitry for the Tank Test Bed.

"To be successful in these major areas of investigation and future ones, Vetronics Laboratory personnel must do more than keep abreast of the latest technology," Bielawski said. "They must themselves be the leading edge in new developments."

Examples where the laboratory is in the forefront of technology, Bielawski said, are innovations in fault tolerant and reconfigurable computer networks, use of flat-panel displays to reduce the space requirements of conventional cathode-ray-tube devices and development of on-board diagnostics/prognostics and training to improve efficiency and reduce life-cycle costs.

## Around the World... ..in GD

**CHQ:** William D. Pass, Michael L. Callahan and Jamison B. Hymes joined as Internal Auditor . . . Janice M. Greene and Thomas C. Novaral as Senior Auditor . . . Charles D. Niewoehner as Aircraft Maintenance Specialist . . . Brian P. Carmody as Subcontract Auditor . . . Charles T. Barrett transferred from Fort Worth and was promoted to Manager of Corporate Accounting . . . Daniel T. Trew transferred from Fort Worth and was promoted to Corporate Manager, Financial Planning-Aerospace . . . Robert J. Connor was promoted to Corporate Marketing Manager-Europe.

**Fort Worth:** Theodore M. Allen was promoted to Senior Material Project Administrator . . . Jerry W. Allred to Financial Supervisor . . . Ronald H. Arnold, Rodger Gilley and Pat B. McDonald to Industrial Engineering Specialist . . . William L. Boddie to Manager of F-16 Programs . . . Johnny B. Browder Jr. to F-16 International Offset Manager-Israel . . . Warren L. Carroll to F-16 Coproduction Chief . . . William A. Carter to International Resident Office Manager . . . Gilbert L. Danielson to Financial Specialist . . . James W. Diggs, Ollon R. Hamrick, Walter J. Rainwater Jr. and Carol A. Rice to Engineering Administrative Supervisor . . . Alfred G. Drysdale, William B. Rose Jr. and Stephen B. Smith to Program Specialist . . . Howard M. Edwards to International Coproduction Manager . . . Dale C. Ford, William T. Habenicht, Harold T. Johnson, Robert W. Lynch Jr., Samuel O. Majors, Robert W. McAnally, William J. Moran, Hubert L. Patrick and Billy J. Wallace to Project Engineer . . . Robert L. Gallo to Senior Manufacturing Technology Engineering Specialist . . . James R. Goolsby, Henry R. Klawitter, Charles L. Ward Jr. and Jack V. Williams to Engineering Chief . . . Donald F. Jenkins to Logistics Group Supervisor . . . James W. Jennings to Project Manager . . . Tapley G. Logue to F-16 Administration and Finance Manager . . . Jerry V. McMichael and John W. Stanbery to Senior Field Service Engineer . . . James C. Packard to General Foreman . . . Scott F. Reeves and George G. Tucker to Field Service Engineer . . . David S. Schruha to Senior Technical Publications Analyst . . . Roy W. Shaw to Manufacturing Control General Supervisor . . . Robbie D. Shive to Program Estimator . . . Garrett S. VanMeter Jr. to Assistant Project Engineer.

**Electric Boat:** Victor Adgalanis, John Michels and Timothy Donovan were promoted to Foreman . . . Richard Frizell and Hugh Glynn to Chief of Engineering . . . Gregory Jordan and John Lesser to Engineering Administration Supervisor . . . James Orce to Chief Test Engineer . . . Joseph Pulawski to Engineering Supervisor . . . Stanley Dalrymple to Quality Assurance Program Management Chief . . . At Quonset Point, Mike Giacheri to Foreman . . . David Ritchotte to Trade Control Supervisor . . . At Avenel, Andrew Hackler to General Foreman.

**Pomona:** Arthur V. Bridge was promoted to Senior Plans and Analysis Staff Analyst . . . Noretta J. Cade to Senior Quality Assurance Specialist . . . William A. Cockayne and William D. Hatfield to Superintendent . . . Allen L. Coloman to Plans and Analysis Staff Specialist . . . Richard W. Crawford Jr. to Electronics Engineer . . . Corinne E. Elhai to Manager of Procurement . . . Kevin S. Lewis, Delano H. Alli and Darrel M. Kleeman to Group Engineer . . . Scott G. Martin to Project Engineer . . . Marco F. Masone to Senior Manufacturing Test Engineer . . . Joel Nouel and Gregory E. Brobston to Project Coordinator . . . Robert Perez to Assistant Project Engineer . . . Edward B. Power to Senior Research Engineer . . . Diana L. Quirk to Specifications Analyst . . . Marjorie R. Schmidt to Administrative Services General Supervisor . . . William J. Velto to Logistics Representative . . . John R. Weaver to Manufacturing Manager . . . Edward Zeman to Administrative Supervisor . . . Robert N. Burkhard Jr. and Harold W. McLaughlin to Manufacturing Group Engineer . . . James A. Fall to Senior Manufacturing Engineer . . . Michael J. Jurina Jr. to Special Production Projects Manager . . . Donald L. Mallich to Project Representative . . . Phillip E. Morlock Jr. to Master Scheduler . . . John W. Palmer Jr. to Senior Project Engineer . . . Joseph M. Harrison to Production Support Chief . . . At Navajo, Michael L. Enfield to Plant Manager . . . At Camden, Ted C. Bernard transferred from Corporate and was promoted to Facilities Manager.

**Convair:** Thomas Maslo, William R. McPherson, Paul E. Oeffinger, Eric N. Sillman, Charles T. Wells and Ralph R. Sharp were promoted to Publications Supervisor . . . Dennis J. Honeycutt to Operations General Supervisor-Manufacturing . . . Nancy M. Swanson and Arnold C. Gruner to Operations Supervisor-Manufacturing . . . Donald E. Jay to Quality Control Supervisor . . . Keith D. Chapman to Supervisor-Quality Assurance-Base . . . Gilbert T. Draper, Randy D. McClellan and Samuel D. Carlile to Group Engineer . . . Vernon O. Kettler and Raymond W. Stoker to Engineering Chief . . . Richard A. Jones to Engineering Manager . . . Darrell E. Parsons to Program Manager.

**Electronics:** Timothy E. Connolly, Theresa J. Gonzalez, Valerie L. Hirakami, Jeff B. Johnson, John V. Razler and Richard N. Saldivar were promoted to Factory Engineer . . . John C. Bevers and Beverly A. Kuver to Product Test Supervisor . . . Joseph H. Kent Jr. to Product Test Engineer . . . Robert R. Coffman to F-16 AIS Programs Director . . . James A. Kitsos to Engineering Section Head . . . Joe L. Luna and Joe Gueneberg to Operations Section Head . . . Walt P. Robertson to Programs Director-B-1B IATE.

**Quincy:** Gary Reynolds was promoted to Superintendent . . . Chester LaPine, William Locke and David Fuller to Production Support Supervisor . . . Philip VonIderstein, Robert Bostwick, Daniel Vaughn, Daniel Duncan, Kenneth Cox, Roderick Drummond, Michael Walsh, Donald Oxenhorn, Daniel Crowley, Robert Carbone, Carlos Couto, Gary Medeiros and Stephen Randall to Foreman . . . Charles Griswold, Paul Pike, John Clarey, Richard Owen and David Marani to General Foreman . . . Kathryn Welsh to Staff Assistant . . . James Delaney to Machine Shop Business Manager . . . Thomas Flaherty to Trade Planning Supervisor . . . James Donohue to Senior Facilities Engineer . . . Kevin Harkenrider to Assistant Manager, Trade Planning/Production Control . . . William O'Rourke, Charles Hatch and Gordon Braileford to Chief of Production Support . . . Homer May to Design Chief . . . David Croan to Assistant Material Control Manager . . . John Craft to Director of Marketing-Navy Programs . . . Richard Wall to Production Support General Supervisor . . . Thomas Campbell to Manufacturing Engineer . . . Vincent Gulino, Leo Stewart, George Pearson Jr. and Ronald Andrews to Engineering Planner . . . William Ryan and Thomas Larrivee to Employee Development Instructor.

### Savings and Stock Investment Values

Salaried	November 1981	November 1982	November 1983
Government Bonds	\$ 2.8071	\$ 3.3096	\$ 3.6100
Diversified Portfolio	2.1371	2.5804	3.2414
Fixed Income	1.2718	1.4172	1.5888
Hourly			
Government Bonds	2.8045	3.3076	3.6084
Diversified Portfolio	2.1824	2.6352	3.3076
GD Stock	\$23.2500	\$31.1300	\$58.3750



## Donald Whisler Is New Director-Program Finance

Donald W. Whisler has been named Director-Program Finance for Convair. He was previously Director-Space Business Operations for the division.



Whisler

In his new position, Whisler will be responsible for all program finance activities in the division Controller's office, including cruise missiles, aircraft and energy systems, space and advanced programs.

Whisler joined Convair in April 1982 after a number of years with The Boeing Company. He holds a Bachelor of Arts degree in Chemistry and Mathematics from the University of Colorado and a Master of Business Administration degree in Finance from the same school.

## DatagraphiX Has Delivered 2,000 AutoCOM Units

DatagraphiX has delivered its 2,000th AutoCOM System, the company's most popular Computer Output Microfilm recorder.

The milestone AutoCOM, an On-Line AutoCOM II with an off-line tape option, was delivered this month to Southern California Edison.

R. A. Steele, DatagraphiX Vice President of Marketing, said the system "was designed to provide intelligent on-line operation in a variety of data processing environments."

"Utilizing a 64K-byte microcomputer system," Steele said, "the unit interfaces directly with all IBM Model 360 through Model 308X computers as well as IBM-compatible devices. It processes data into fully titled, indexed microfiche at speeds up to 12,000 lines per minute."

## Fort Worth, Convair Representatives on AIA Committees

Gordon L. Brownlee, Manager of Fort Worth's Support Training Department, was recently elected chairman of the Aerospace Industries Association's Product Support Committee. Four other company employees, three from Fort Worth and one from Convair, serve on AIA working committees under Product Support.

Brownlee has been Corporate Representative on the Product Support Committee for five years and was Vice Chairman last year. He is also a member of the Manpower, Personnel and Training subcommittee, which is one of five comprising Product Support.

Lawrence J. Hayes, Manager of Convair's Product Support Department, is Chairman of the Spare Parts subcommittee. Bill Roberts, Director of Technical Publications at Fort Worth, is a member of the Service Publications working committee.

Jack Tierney, Director of Logistics Requirements at Fort Worth, is a member of the Logistics Operations subcommittee, and Tim Roels, Fort Worth's Manager of Field Product Support, serves on the Field Support subcommittee.

AIA is a trade association representing approximately 60 of the nation's major manufacturers of military and commercial aviation products.



**Critical Salvage.** Convair has been presented with a special resolution from the San Diego City Council expressing gratitude for the company's service to the community and the San Diego Public Library. The award recognized the contribution the company made to salvaging the water-damaged newspaper collection of the Library through its vacuum-drying expertise. Shown with the citation are left to right, Patricia Allely, Deputy Director of the San Diego City Library; Jack D. Coffman, Convair's Director of Fabrication & Tooling; David Jahn, representing the University of California-San Diego Library, a consultant in the salvage effort, and W. E. Butler, Operations General Supervisor of Plastics, who provided the equipment and conducted the vacuum-drying project.

## Pomona Adopts a Convair Program

Pomona and its chapter of the National Management Association have "adopted" Walnut High School in Walnut, Calif., as part of a nationwide program in which industry supports local schools by adopting a school for a year.

Jack Plummer, a representative of the National Management Association, recently presented a Declaration of Adoption to Don Skraba, the school's principal, in a ceremony attended by students, parents and officials from Pomona, the

school and the city.

Plummer, the NMA chapter's Director of Communications and Community Services, proposed the program to chapter and division officials after reviewing the results of a similar program at Convair.

An added factor to starting the program was the recent proclamation by President Reagan naming the period from October 1, 1983, through June 30, 1984, as the National Year of Partnerships in Education.

## Scherer to Direct Commercial Space Programs

Dr. Lee R. Scherer has been appointed Program Director-Commercial Space Programs at Convair.

Scherer is responsible for defining customer requirements, developing commercial business plans using the division's launch vehicle production and launch services and monitoring program performance. He reports to William E. Rector III, Division Vice President and Program Director-Space Programs.



Scherer

A former Navy captain, Scherer joined the National Aeronautics and Space Administration in 1964. He held positions of increasing responsibility with NASA, including three years as Director of the Dryden Flight Research Center in California and five years as Director of the John F. Kennedy Space Center in Florida. Before joining General Dynamics, he was Vice President-Energy Services at Stottler Stagg & Associates, an architectural and engineering company in Florida.

Scherer was graduated from the United States Naval Academy and later earned a Bachelor of Science degree in Aeronautical Engineering from the United States Naval Postgraduate School. He also holds a Professional Degree in Aeronautical Engineering from the California Institute of Technology.

## GD Flashback

### Quincy Shipyard Built Unique Schooner in 1902

Of the hundreds of vessels built at the Quincy, Mass., shipyard, possibly the most unusual was the *Thomas W. Lawson*. Built in 1902 by the Fore River Ship and Engine Co. — forerunner of General Dynamics' Quincy Shipbuilding Division — she was the only seven-masted, steel-hulled schooner ever built.

In 1901, a retired skipper, Capt. John G. Crowley, and a group of investors awarded the Quincy shipyard a contract for \$240,000 to build a coal ship, which was to be named after Thomas W. Lawson, one of her financial backers and a millionaire from Scituate, Mass. She was launched on July 10, 1902, with Helen Watson, daughter of the shipyard's owner, Thomas A. Watson, as the sponsor.

There were mixed opinions about the number of masts and the size of the collier, which was developed by B. B. Crowninshield of Boston, a designer of several small and successful racing craft. The unique vessel was 403 feet long, had a 50-foot beam, and was registered at 4,914 tons. She was equipped with 25 different sails on her seven masts and, when under full sail, spread 43,000 square feet of canvas, considered by her critics to be a modest amount considering her large size. The seven masts, each about 200 feet tall, were the fore, main, mizzen, rusher, driver, jigger and spanker. The lower sections, each 135 feet high, were made of steel, while the upper sections, which reached another 58 feet in the air, were made of Oregon pine. Each mast carried about 6,000 square feet of canvas.

Crowninshield's design attempted to avoid the high operating expenses of square-rigged ships. On a square-rigged ship, the four-sided main sails are extended on yards — or cross beams — fastened to the masts horizontally at their centers.

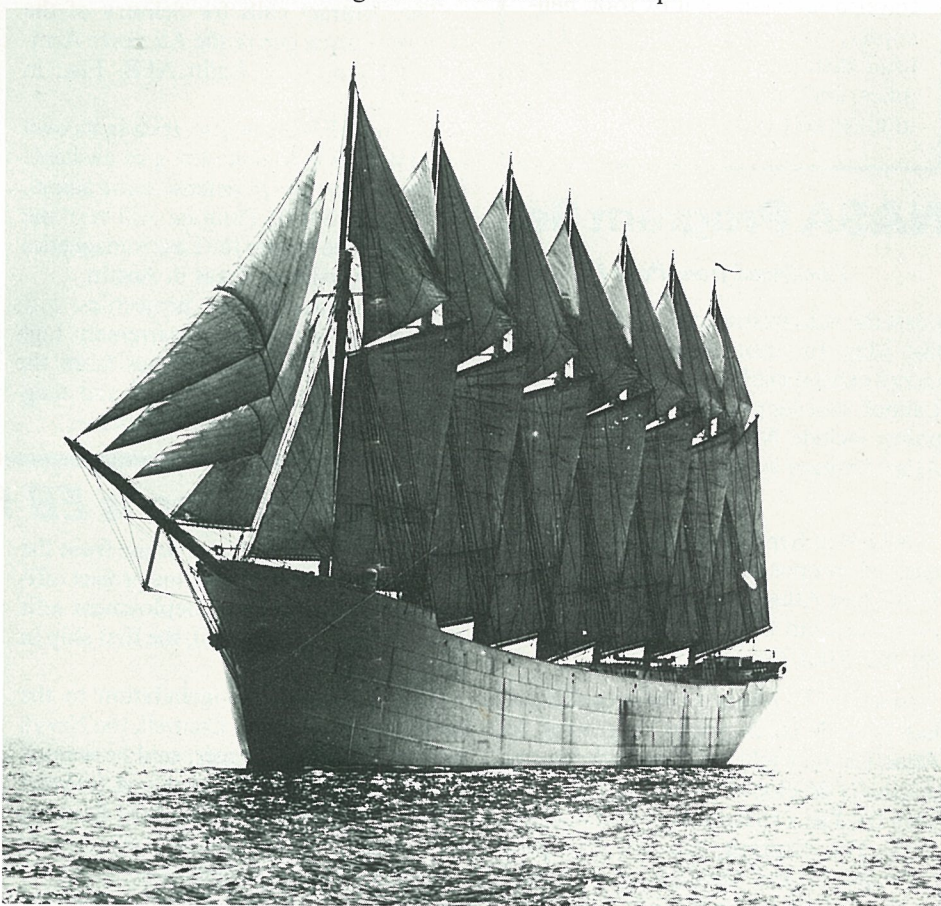
The *Lawson's* rigging was typical of fore-and-aft schooners in which the main sails run from the masts back toward the stern in a general line with the length of the hull. A major advantage of this type of rigging was that it required fewer men to handle it. The *Lawson* was an extreme example of this as only 15 men of her 27-man crew were assigned to the rigging. These 15 men, aided by six steam-operated winches to change the rigging, actually sailed the ship.

Crowninshield also designed the *Lawson* to avoid the structural weaknesses of very large wooden hulls. The *Lawson's* steel hull promised greater strength with less than half the weight of wood. The saving in weight was so great that Crowninshield provided his ship with a four-foot-deep double bottom that could be pumped with water ballast to stiffen her when she was lightly laden. Her double cellular bottom contained 1,000 tons of water ballast and a trimming tank at each end of the ship.

Since the *Lawson* had too small a sail area for the size of the hull, she was not a very fast ship and was too large for the coal shipping business for which she was originally intended. In the summer of 1906, she was chartered to an oil company, which converted her to a tanker with 14 large tanks for carrying oil in bulk. The size of the tanks is indicated by the fact that two of her seamen drowned in one of the oil tanks during a storm off Florida.

Her short career was full of many difficulties, and it ended in disaster. The *Lawson* sailed on Nov. 15, 1907, from a refinery port near Philadelphia bound for London with a cargo of 6,000 tons of oil. She encountered a storm near the Scilly Islands off the Cornish Coast on Dec. 12, 1907, and went down in the early hours of the next day after being battered helplessly on the rocks. Capt. Geoffrey Dow and her engineer, Edward Rowe, were the only members of her crew to survive the wreck. Unfortunately, while the cargo was insured, the ship, herself, was not.

Captain Crowley, meanwhile, had been so pleased with the job the Quincy yard had done on the *Lawson* that he placed an order for another steel-hulled ship, the *William L. Douglas*, which later took her place in history as the largest six-masted steel collier ever built.



The Thomas W. Lawson Under Full Sail

# GD World

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# F-111 Program Had an Excellent Year in Funding and Restorations

## Backlog Increases For Modernization And Improvements

Fort Worth's F-111 program, which has continued to grow in recent years, had another excellent year in 1983.

Highlights of the year included the winning of a \$142-million contract from the U.S. Air Force for the FB-111A Avionics Modernization Program, deliveries to the Air Force of three restored F-111s, a \$22.5-million Congressional appropriation for restoration of additional aircraft in the future and the start of a number of funded studies on further modifications and improvements being considered for the F-111 fleet.

As a result of these and other events, the F-111 program now has the largest funded backlog since delivery of the final production aircraft in 1976.

The F-111's fine performance in operational service in 1983 was of perhaps the greatest importance to the aircraft's future, said John P. Lamers, Vice President and F-111 Program Director.

F-111Es and F-111Fs continue to perform well in their front-line roles as vital elements in NATO's European defenses. FB-111As are on alert with the Strategic Air Command. The 309th Bomb Wing from Pease AFB, N.H., flying FB-111As, again won the coveted Fairchild Trophy in SAC's annual bombing/navigation competition.

The F-111Ds of the Air Force's 27th Tactical Fighter Wing, Cannon AFB, N.M., performed superbly in diverse environments during deployments to Alaska, Korea, Egypt and England in 1983. High mission-capable rates were consistently achieved during intensive exercises on these four deployments. The Royal Australian Air Force's F-111Cs and RF-111Cs also enjoyed a successful year operating from their base at Amberley.

### F-111C Navigator Wins Strange Race

The Australian F-111 program accounted for the most unusual event of 1983 when Flying Officer Chris Deeble, an F-111C navigator from One Squadron, Amberley, won an 1100-kilometer race from the town mall in the center of Townsville, Queensland, to the town mall in the center of Brisbane. The race had 134 entrants, including 12 private jets.

While Deeble covered the greater part of the race in an F-111, he also traveled segments of it by foot, helicopter, boat and motorbike. The total distance was more than 680 miles, and he finished in 1 hour, 21 minutes and 19 seconds.

## NASA Program Set

*Continued from Page 1*

ports the Administration's policy, initiated last May, to commercialize the government's expendable launch vehicle program. Launch vehicles potentially subject to this policy include NASA's Scout, Delta and Atlas/Centaur systems and the Air Force Titan.

NASA in September 1983 formally requested proposals to commercialize its Delta and Atlas/Centaur programs. The proposal from Convair was the only one for the Atlas/Centaur program.

Since 1962, General Dynamics/Convair has been NASA's prime contractor for Atlas/Centaur vehicles. The Atlas booster, originally developed for the Air Force, has been used as a space launch booster since 1958. The Centaur, the first cryogenic hydrogen-oxygen launch stage, was developed for NASA and has been used since the mid-1960s.



USAF F-111 on Training Mission in England.

## GD Wins Important Contracts

### Approved Funding For 75 Israeli F-16s

*Continued from Page 1*

Deliveries of the aircraft will begin in 1986 and continue through 1987. The government of Israel signed a Letter of Agreement for the purchase last August.

The last aircraft in Israel's original purchase of 75 F-16A/Bs was delivered from the Fort Worth assembly line in 1981.

### Netherlands Approval For 57 More F-16s

The Netherlands Parliament has approved the Royal Netherlands Air Force's plan to purchase 57 additional F-16s. The country already has 156 aircraft on order, and the new purchase will bring the total to 213.

To date, 93 of the original F-16s have been delivered. The aircraft in the new buy, as the country's other F-16s, are to be assembled by Fokker at its factory near Amsterdam.

The last aircraft under the new order would be delivered in 1992.

### Electromagnetic Gun Contract to Pomona

Pomona has received a \$1.16 million contract from the U.S. Air Force for the design, fabrication, testing and delivery of a repetitive electromagnetic gun.

The contract calls for delivery of the electromagnetic gun to the Air Force Armament Laboratory, Eglin AFB, Fla., in late 1984.

The USAF will conduct tests in its own facilities and will make the gun available for testing by other defense contractors. Prior to delivery, Pomona will test the weapon at the Center for Electromagnetics at the University of Texas in Austin.

The gun accelerates projectiles with electromagnetic force at extremely high velocities. Its firepower comes from the interaction of electric currents and magnetic fields to achieve these velocities.

### Navy Commends EB for Ohio Refit Work

Electric Boat has drawn praise from the Navy's top Trident submarine project officer for its work on a predeployment refit of USS *Ohio* (SSBN 726), the first ship in her class.

In a Letter of Commendation to the division, Capt. Walter Cantrell, the Navy's Trident Project Manager, said he wanted to "recognize the dedicated and talented men and women of Electric Boat Division who supported the shaft seal replacement during the predeployment refit . . ."

The job, Captain Cantrell continued, was performed "in a most effective and

The practicality of the electric gun concept relies on technological developments in the areas of power device and materials science.

General Dynamics made a commitment in 1979-80 to develop electromagnetic propulsion technology for use in advanced gun weapons systems. Since then, the company has invested its own funds in the development.

The contract awarded to Pomona is funded both by the Air Force and the Defense Advanced Research Projects Agency.

### \$34 Million Award For Sparrow Systems

The Department of Defense has awarded a \$34,381,730 add-on contract to General Dynamics for the Sparrow AIM-7M missile. The work will be performed at Pomona's East Camden, Ark., plant.

The contract calls for 404 Sparrow guidance and control sets for the Navy and 250 for the Air Force. The contract is a continuation of awards made in January and July of 1983 and completes the funding requirements for a total of 2,054 guidance and control sets with a total contract value of \$159 million.

### Egypt, Saudia Arabia Orders for M60s

Land Systems recently signed a letter contract with the U.S. Army's Tank Automotive Command for the production of 94 M60A3 tanks for Egypt. The tanks will be assembled at the Detroit Arsenal Tank Plant.

In addition, the governments of the United States and Saudi Arabia have signed a Letter of Agreement that will result in a contract for the production of an additional 100 M60A3 tanks.

"These contracts will keep the M60 production line rolling into mid-1985," said A.W. Carion, M60 Program Director.

efficient manner. The demonstrated readiness and mobility of Electric Boat Division resources in support of the potential shaft replacement effort were no less than outstanding."

Capt. Robert Fox, Navy Supervisor of Shipbuilding at Groton, added his commendation in a separate letter. "The Supervisor of Shipbuilding organization," he wrote, "also commends the efforts of the Electric Boat Division personnel involved with the . . . (project)."

The refit was performed late last fall.

## Seventh Damaged F-111 Restored to Operational Status

Fort Worth recently completed the restoration of another damaged F-111, the seventh to date, and returned the aircraft to the U.S. Air Force in full operational condition.

Received at Fort Worth's restoration center in May of 1982, F-111D No. 64 was damaged when failure of an engine seal caused an in-flight fire in January 1979 near Cannon AFB, N.M. The rebuilt aircraft has been returned to Cannon and is flying again after being inoperative for nearly five years.

Restoration is under way on two more aircraft, an F-111D and an F-111A, and on three F-111 wings. The Air Force will use the wings as spares.

The F-111D, No. 43, received severe damage in an in-flight fire in July 1981 and was damaged further during the emergency landing that followed.

The F-111A, No. 146, ingested a large bird in its right-hand engine while on a low-level training flight over southwestern Montana in August 1982. The aircraft received significant engine and fuselage damage due to fan blade failure and a fire. The crew, Maj. William D. Patton and 1st Lt. Christopher A. Singalewitch of the 366th Tactical Fighter Wing, Mountain Home AFB, Idaho, were formally commended by the Air Force for outstanding airmanship in bringing the airplane to a safe emergency landing at a civilian field in southeastern Idaho. The airplane was trucked to Fort Worth for restoration and is scheduled to fly again in early 1985.

Economical restoration of an aircraft sometimes requires both skill and inventiveness on the part of the technicians making the repairs, said John P. Lamers, Vice President and F-111 Program Director. For example, it may be possible to repair an internal component while it is still mated to the aircraft in order to avoid tearing down other structural parts.

Each restored aircraft must pass a rigorous inspection by an Air Force acceptance team and must perform as well and be as maintainable as if it had never been damaged. Air Force squadrons that receive restored F-111s use them interchangeably with their other aircraft.

During restoration, the aircraft are updated with the latest service orders to make them current with the other aircraft in the Air Force's F-111 fleet.

Restoration is a bargain for the Air Force because the cost of rebuilding an F-111 is less than 10 percent of the price of a new airplane, said Jerry Parris, F-111 Restoration Program Manager.

The F-111's anticipated service life extends past the year 2010.

### Atlas-E Launches Weather Satellite For USAF, Navy

The second in a series of Defense Meteorological Satellite Program weather satellites was launched into orbit recently from Vandenberg AFB, Calif., by a Convair-built Atlas-E.

The Atlas placed the 1,656-pound satellite into a 450-mile subsynchronous orbit, where it will collect weather data for the Air Force's Weather Service and the Navy's Oceanography Command.

### Thunderbirds Had Successful Year

The U.S. Air Force Thunderbirds, flying multimission F-16 Falcon aircraft, have completed "the most successful year in the history" of the aerial demonstration squadron, according to Capt. Jerry Thomas spokesman for the 125-member team.

The team, which opened the season with a show at Nellis Air Force Base on April 2nd, performed before more than 16.5 million persons in 65 locations in 33 states.



## GLCM Team Is Cited by Weinberger

The General Dynamics/Convair Ground Launched Cruise Missile team was cited recently by Secretary of Defense Caspar W. Weinberger for its successful efforts to achieve the Initial Operating Capability (IOC) of the GLCM. In a message to the team sent on February 2nd to the attention of Jerry Butsko, Convair GLCM Program Manager, Secretary Weinberger said:

"The GLCM team of Army, Navy, Air Force, Department of Energy and contractor personnel have completed the necessary actions to achieve the scheduled GLCM IOC in December 1983. This new capability meets our commitment to NATO and provides a significant increase in our ability to deter aggression. I have been impressed by the efforts of all those who have overcome the many problems associated in deploying a major weapon system on schedule. The men and women of your organizations have my personal thanks for their dedication, hard work and contributions to this success. Please convey my appreciation to them."

## USS Georgia, 4th Trident, Is Commissioned

Hailed as part of "the keystone to America's strategic forces for the rest of this century," the nation's fourth Trident submarine, USS *Georgia* (SSBN 729), was commissioned February 11th across the Thames River from her birthplace at Electric Boat.

Speaking to a crowd of 1,000 spectators gathered on a fog-shrouded pier at the Naval Underwater Systems Center in New London, Conn., Senator Mack Mattingly of Georgia said that the Trident program "is a good example of what careful planning can bring forth."

"Controversy and debate have raged over the bomber and missile programs," Senator Mattingly said, "but one leg of the Triad which is rarely if ever questioned is the Trident submarine."

Senator Mattingly, Chairman of the Senate Appropriations Committee's Military Construction subcommittee, talked of the need for consistency in defense spending, warning that "We cannot continue to have periods of cutbacks and then periods of crash buildups." He said that the U.S. "is now playing catch-up, and that is an expensive game."

Adm. James D. Watkins, Chief of Naval Operations, said that *Georgia* and her sister ships "will remain our most stealthy system of defense through this

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# GD World

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February 1984



"I Christen Thee . . ." Diana Cohen, wife of Senator William Cohen of Maine, christens the fast-attack submarine *Augusta*. Looking on are (from left): Mrs. Dorothy Nelson, Mrs. Cohen's mother and Matron of Honor; Senator Cohen; Robert Conn, Deputy Under Secretary of the Navy for Financial Management, and David S. Lewis, Chairman and Chief Executive Officer of General Dynamics.

## Sen. Cohen Discloses Existence Of New Classes of Soviet Boats Announcement Made At Augusta Launching

Visitors and employees on hand at Electric Boat January 21st for the launching of the fast-attack submarine *Augusta* (SSN 710) heard the principal speaker make the first public announcement that the Soviet Union has two new classes of submarines.

William Cohen, Maine's senior Senator and Chairman of the Senate Subcommittee on Sea Power and Force Projection, revealed that U.S. intelligence sources "were surprised by the unexpected early appearance of two additional new classes, the Mike and the Sierra."

Senator Cohen said the information "has not been declassified until now."

Cohen said the Mike "appears to be a follow-on to the very high-speed, deep-diving Alfa, while the Sierra appears to be a follow-on to the Victor." *Jane's Fighting Ships*, the authoritative source on the world's navies, identifies both Alfa and Victor as attack submarine classes.

The Senator said that the U.S. has not kept pace with the expansion of the Soviet Navy and Merchant Marine. "It is clear," he warned, "that the Soviets are building a blue-water navy in order to project power to distant lands and to be in a position to challenge our naval capability whenever they see it expedient to do so."

Cohen termed the christening of *Augusta* "evidence that naval supremacy has been our history and will continue to be our future. The price is high, but in the

*Continued on Page 4*

## M1 Powertrain Durability Test Is Successful

The M1 main battle tank reached an important milestone recently when it completed a powertrain durability test in which the results exceeded all of the U.S. Army's durability requirements.

With the successful completion of the test, Land Systems will be able to increase production beyond the 60 per month limitation imposed by the Congress a year ago. This will permit an initial acceleration in production to 70 tanks per month to meet the current production authorization.

The Army from July to December tested seven new production tanks at the Aberdeen Proving Grounds to demonstrate a 50 percent probability of achieving

4,000 miles without replacing the engine, the transmission or the final drives.

The final score, as determined by the Army judges, was an outstanding 66 percent probability of meeting the 4,000-mile requirement.

The test teams were composed of both military and civilian crews, and the Avco AGT-1500 turbine engines were randomly selected from the production quantities available at the Lima Army Tank Plant.

The seven tanks completed more than 28,000 miles of varied operation, including running on gravel roads, traversing rugged cross-country terrain and the periodic firing of the main gun during the trials.

No more than five failures were allowed in order to achieve the required 50 percent

## 1983 Earnings, Performance Showed Gains

All of the company's divisions and subsidiaries were profitable in 1983 and performance continued to improve company-wide throughout the year, according to David S. Lewis, Chairman and Chief Executive Officer.

Lewis made the announcement February 2nd in his report on the company's earnings for the fourth quarter and the full year of 1983.

In reviewing the company's operations, Lewis added that the Fort Worth Division was the most profitable, with Electric Boat showing the most improvement and finishing second.

Lewis said that Electric Boat, after many years of losses on submarine construction contracts, "is now performing very well on all of its programs and is making significant contributions to the company's earnings."

The company announced that net earnings in the fourth quarter of 1983 were \$80.4 million, or \$1.52 per share, up 25 percent over the \$64.1 million, or \$1.17 per share, earned in the fourth quarter of 1982. Net earnings in the 1982 quarter included a write-off of \$6.9 million, or 13 cents per share, to cover costs associated with the closing of an underground coal mine. Sales in the 1983 fourth quarter were \$1.8 billion, the same as the fourth quarter of 1982.

Earnings for the full year of 1983 were \$286.6 million, or \$5.30 per share, on sales of \$7.1 billion, compared to \$132.8 million, or \$2.41 per share, in 1982 on sales of \$6.2 billion. Earnings for 1982 had been reduced by \$90.6 million, or \$1.67 per share, for the fourth quarter write-off and to cover write-offs earlier in the year on ship construction programs (\$56.0 million) and for losses from now discontinued operations (\$27.7 million).

The company's funded backlog at year-end was a new high of \$16.5 billion, and funded and unfunded backlog was \$19.5 billion. The comparable figures at year-end 1982 were \$15.1 billion and \$18.4 billion, respectively.

*Continued on Page 4*



**GENERAL DYNAMICS**  
Pierre Laclede Center, St. Louis, Missouri 63105

Address Correction Requested

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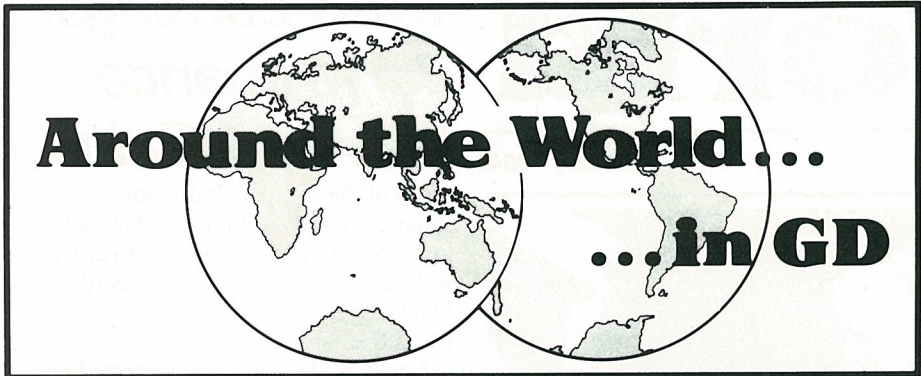
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**Joining the Fleet.** With her crew at attention on deck, USS *Georgia* (SSBN 729), the nation's fourth Trident submarine, presents an impressive spectacle for guests

during commissioning ceremonies February 11th at the Naval Underwater Systems Center in New London, Conn. The ship was delivered January 17th.





**CHQ:** Steven G. Roe joined as Internal Auditor . . . Austin L. Tenette as Subcontract Auditor . . . Ramona C. Stefford as Corporate Network Financial Manager . . . Daniel T. Elder as Corporate Tax Accountant . . . Michael C. Wasielewski transferred from Electronics and was promoted to Corporate Marketing Manager-Europe . . . Thomas G. Cambron was promoted to Senior Auditor . . . Nancy Fronckewicz to International Business Development Representative . . . Richard T. Mitchell to Corporate Manager of Shareholder Services . . . Peggy L. True to General Accounting Supervisor.

**Fort Worth:** B.K. Bradfield was promoted to Chief of Security and Investigation . . . Clifford O. Briggs and Michael H. Kays to Technical Group Supervisor . . . Earl H. Burnam to Program Specialist . . . Andrew J. Campbell, III to Senior Manufacturing Engineer . . . Richard D. Clover to Chief of Procurement . . . William M. Coffman Jr. to Schedules Specialist . . . Dennis C. Colby to Associate Counsel . . . George F. Conant Jr. to Engineering Chief . . . Paul G. Cormier to Production Specialist . . . Bill C. Cornelius, John H. Howell and William A. Walters to Administrative Services Chief . . . Robert O. Cox, George J. Komechak and Edwin L. Presley to Project Engineer . . . Thomas E. Coyle and Frederick E. Lewis to Assistant Project Engineer . . . Vernon L. Denena to Principal Field Service Engineer . . . Norbert A. Durando to Manager of Offset Planning . . . William S. Fitts to Schedules Engineer . . . Frederick G. Foerster to Project Tool Engineer . . . Marilyn R. Gabler to Senior Technical Publications Analyst . . . William A. Guinn to Project Manager . . . Ralph D. Heath to Program Director, F-16 Southeast Asia . . . Billy A. Heffington to Manufacturing Technology Engineering Specialist . . . Patrick D. Henderson to Senior Logistics Engineer . . . Mickie D. Homeyer, Ruben R. James, Charles L. Praeger and Thomas Thompson to Field Service Engineer . . . Frank Hubans Jr. to Chief of Quality Assurance-Software . . . Richard D. Kilgore to Material Planning Supervisor . . . Lawrence J. Knapp to Logistics Supervisor . . . Jay W. Laminack to Project Coordinator . . . Joe W. McLean to Chief of Manufacturing Engineering . . . Douglas L. Miller to Program Director, F-16 Middle East . . . William T. Phillips to General Foreman . . . Hector J. Ramirez and Steven C. Sowers to Subcontract Management Coordinator . . . Charles A. Simpson and Joseph A. White to Material Program Administrator . . . Bonnie L. Stahnke to Security Services Supervisor . . . Peter G. Tulley to Senior Field Service Engineer.

**Electric Boat:** Paul Huard and Elliott Larose were promoted to Chief of Logistics . . . Robert Jeffreys to Chief of Engineering . . . David Remmert to Chief Engineer-Engineering Services . . . John Spinner to Chief Engineer-Logistics Engineering . . . John Featherstone to Engineering Supervisor . . . Benjamin Doyle and Franklin Saunders to General Foreman . . . William Dorr to Technical Services Supervisor . . . Woodman White to Foreman . . . At Avenel, Joe Jackson to Manager of Product Assurance.

**Pomona:** Paul L. Boettcher, Terence J. Plaza and Robert Strike were promoted to Section Head . . . James W. Duncan to Manufacturing Development Engineer . . . Joe Gutierrez to Engineering Manager . . . Barton K. Heiligers, David Ramirez and Jerry E. Rector to Manufacturing Group Engineer . . . Kathy D. Johnston to Development/Training Representative . . . Marc Koenig to Project Coordinator . . . Billy J. Middleton to Master Schedules Administrator . . . Eunice E. Novak to Senior Facilities Specialist . . . Ronald R. Podgorski and David F. Martinez to Group Engineer . . . Edward Reingrover to Program Manager . . . David G. Ryan to Senior Cost Control Analyst . . . Christopher M. Taylor to Chief Production Support . . . Karl J. Trautwein to Senior Estimator . . . Charles L. Turner to Manager Program Administration . . . Kaye B. Willet to Staff Assistant . . . Douglas R. Adams to Facilities Specialist . . . Jack E. Adams to Facilities Supervisor . . . Robert L. Chancellor to Project Representative . . . Wayne C. Floyd and John W. Vaughn to Manufacturing Control Coordinator . . . Anthony D. King to Design Specialist . . . Mark L. Miller to Electronics Engineer . . . Richard K. Polly to Project Engineer . . . Ann S. Viramontes to Senior Property Auditor . . . At Camden, James F. Curtis and Margaret J. Parker to General Supervisor . . . Robert D. Spivey to Group Engineer . . . Allen W. Ash to Estimating Specialist . . . Donald L. German to Cost Control Specialist.

**Convair:** Donald V. Colt, Phillip K. Noland and Harvey W. Wright were promoted to Purchasing Agent . . . Lowell D. Davison to Administrative Chief . . . Dean W. Gudgel to Procurement Chief . . . James J. Heffron to Project Engineering Chief . . . James G. McIntyre to Operations Manager . . . Thomas G. Moore to Material Operations Supervisor . . . Donald A. Nirschl to Engineering Manager . . . Carl Orav, Allan H. Cooper, William G. Nagy and Robert A. Wange to Group Engineer . . . Gerald Owen to Product Support Manager . . . Gerald C. Skinner to Program Manager . . . Paul J. Townsend to Engineering Chief . . . Donald O. Berhow to Procurement Manager . . . David A. Berry to Operations General Supervisor-Manufacturing . . . Andrew D. Falken to Manufacturing Engineering Chief.

**Electronics:** Bill L. Herron, Lance W. McCay and Daryl L. Whitfield were promoted to Superintendent . . . Bob D. Bowen to Program Manager . . . A. Lee Chambers to Technical Support Supervisor . . . Bob E. Cotner to Project Manager . . . John P. Dunham to Senior Project Manager . . . H. Glen Dunham to Financial Supervisor . . . Sal Pardo to Quality Assurance Supervisor.

**Quincy:** William Locke was promoted to General Superintendent . . . David Marani Jr. to General Foreman . . . Robert O'Sullivan to Employment Supervisor . . . Mario Martins to Manager of Graphics & Reproduction . . . Damon Rivard Jr. to

Production Support Supervisor . . . Anthony Litka and Dana Marshall to Special Project Supervisor . . . Dewai Wong, William Pierce, James Maloney, Peter Margan, John McQuaid, Stephen Mowles, Kurt Larsen, Brian Krenzien, John Garvey, Mark Bougie, Marilyn Bowen, Michelle Carter and Michael Clark to Foreman.

**Land Systems:** Fazal M. Khan was promoted to Engineering Supervisor . . . Walter R. Rhodes to Procurement Manager . . . Lawrence B. Chase to Program Manager Chief-Engineering . . . Raymond W. Trempler and Efthymeos T. Geottes to Group Engineer . . . Richard Gillette to Material Control Manager . . . Glen H. Midkiff to Purchasing Agent . . . Ralph A. Scarantino to Engineering Specialist . . . Jerry I. Manastryskyj to Production Planning Specialist . . . Garland R. Williams to Material Control Chief . . . Larry G. Mills to Production Control Chief . . . Ronald E. Adamczyk to Production Planning Supervisor . . . Daniel S. Anderson to Security Officer . . . Elizabeth A. Rentfrow to Financial Specialist . . . John R. Thomas to Administrative Coordinator . . . William L. Fitzgerald to Site Supervisor, ILS Field Operations . . . Bert W. Farmilo to Project Engineering Assistant . . . Mark A. Gardner to Program Specialist-IP1 . . . Gene L. Webster to Senior Planning Engineer . . . Burton L. Jones to Principal Engineer.

**Data Systems:** At Western Center, Louis J. Palmer was promoted to Computer Services Director . . . Janet H. Holcomb to Senior Software Engineer . . . Lawrence A. Miller, Catherine A. Otte, Vicky L. Abbot, Anna L. Abramson, Edward E. Bentz, Joann Berger, John W. Bosse, John V. Cook, Constance P. Davis, David F. O'Neil, Max Schindler, Melissa Sherrod, Robert R. Shipkowsky, Neil A. Stiles and Norma E. Vasques to Business Systems Development Supervisor . . . Kenneth Y. Wang to CAD/CAM Manager . . . David N. Birdsall and Stephen E. Thomason to Business Systems Development Chief . . . James F. Parlier and Robert L. Warren to Engineering Software Supervisor . . . At Central Center, Donald R. Neel, W. Donald Smith and Ross J. Sanders to Engineering Software Supervisor . . . Paul R. Bradley, J. Nicholas Herlevic, Roy E. Irvia, Don E. Keller, Preston L. Sprunger and Norman B. Thurow to Business Systems Development Supervisor . . . Robert B. Gardner, Ronald D. Holister, John E. Lalonde and Gary F. Swannon to Business Systems Development Chief . . . Clarence J. Ransom to CAM Chief . . . At Eastern Center, Larry H. Sogolow to Technical Services Chief . . . William Cliff to Senior Production Control Analyst . . . Dennis Snide to Production Control Specialist . . . Rajalakshmi Atree to Data Systems Analyst . . . Linda Levandowski and Robert L. Degaetano to Operations Service Supervisor . . . James F. Faka to Computer Systems Analyst . . . Gerald H. Geisler to Business Systems Development Supervisor . . . Jean A. Gagliardo and Robert C. Collins to Senior Administrative Financial Analyst.

**GDSC:** William E. Apfel was promoted to F-16 Facilities Manager.

**Datagraphix:** John H. Berry was promoted to District Sales Manager . . . Scott B. Gaylord to Supplies Operations Manager . . . Billy Joe Knight to Production Control Supervisor . . . Giovanni Moretta to Fabrication Operations and Support Supervisor . . . James R. Stabe to Purchasing Agent . . . Richard A. Goff to Quality Assurance Engineering Manager . . . Richard F. Tracey to Quality Assurance Engineering Supervisor . . . Charles G. Schult Jr. to Material Planning Supervisor.

**Material Service:** Alvin A. Cooper was promoted to Manager of Employment . . . James Oakley to Quarry Superintendent . . . David Kingsley to Foreman.



**Cockpit View.** Fort Worth's Neil Anderson (at left) explains the workings of the F-16's instruments and controls to Philip Yeo Liat Kok, Singapore's Permanent Secretary to the Ministry of Defense, as he sits in a mock-up of the Falcon's cockpit at the Asian Aerospace '84 exhibition. Looking on are Dr. Norman E. Thagard (second from left) and USAF Col. Sherwood C. Spring, American astronauts who attended the exhibition in Singapore January 18th-22nd.

## GD Divisions Exhibit Products At Aerospace Show in Singapore

General Dynamics was among several hundred defense firms from around the world that participated last month in Asia's largest display of aerospace products and technology.

The General Dynamics display at the Asian Aerospace '84 exhibition in Singapore January 18th-22nd featured products from the Fort Worth, Pomona, Convair and Land Systems divisions. This was the second such exhibition in Singapore. The first, held two years ago, was limited to commercial products.

A full-scale mock-up of an F-16 cockpit highlighted the display, along with models and material dealing with the Stinger, Phalanx, Standard Missile,

Viper, Atlas Centaur and M60A3 battle tank programs.

High-ranking officials from nations in the area attended the five-day event. Visitors to General Dynamics' display included Singapore's Permanent Secretary to the Ministry of Defense, Philip Yeo Liat Kok; Thailand's Chief of Air Staff, Air Chief Marshal Burusratanaphan Sompol, and Mahmud Iskandar, the Sultan of Johor, a helicopter pilot and aviation enthusiast who became King of Malaysia shortly after the exhibition.

Attendees from Thailand and other countries in Asia heightened interest in the exhibition, and there was a turnout of 20,000 Singaporeans, including many of their Air Force personnel.

### Savings and Stock Investment Values

Salaried	December 1981	December 1982	December 1983
Government Bonds	\$ 2.7892	\$ 3.3649	\$ 3.6347
Diversified Portfolio	2.0894	2.5504	3.1851
Fixed Income	1.2834	1.4313	1.6043
Hourly			
Government Bonds	2.7866	3.3630	3.6332
Diversified Portfolio	2.1335	2.6045	3.2500
GD Stock	\$24.5000	\$33.0000	\$58.1250



## Psihas Named GD Services Company Head

George P. Psihas has been appointed Vice President and General Manager of the General Dynamics Services Company, with responsibility for the subsidiary's worldwide activities in product support services, operations, maintenance and construction management.

Psihas, 56, has been serving as Vice President-Marketing for the Land Systems Division. His career with Land Systems and its predecessor, the Chrysler Defense Group, spans 25 years during which he steadily progressed to increasingly more responsible positions in marketing, planning and administration.

He has had extensive experience in international marketing in addition to functional responsibilities in contracts, estimating, purchasing, planning and personnel.

A native of Detroit, Psihas is a 1951 graduate of the United States Military



George P. Psihas

Academy, where he received a Bachelor of Science degree in Engineering. He also earned Master of Business Administration and Doctor of Business Administration degrees from Indiana Northern University.

Psihas is Co-Chairman of the NATO Industrial Advisory Group of the Department of Defense and is a member of several technical and professional organizations.

## Convair's Suggestion Program Surpassed 1983 Goal by 68%

Convair's Employee Suggestion Program finished 1983 on an upswing, surpassing its annual savings goal by 68 percent. Year-end figures showed validated savings resulting from suggestions totalling \$1,827,460, against a goal of \$1,086,000.

More than one thousand employees received awards for their suggestions in 1983, receiving total awards of \$153,210. Nearly half of that amount was awarded in the fourth quarter, during which 362 employees received \$72,627 for suggestions which represented \$959,147 in first-year savings.

Six employees received major awards during the last part of December. JoAnn Ross, a senior buyer in Purchasing, received a \$10,000 maximum award for her suggestion that resistors, capacitors and diodes not be individually packaged, pointing out that such packaging costs from 15 cents to 50 cents each. Projected savings from her suggestion came to more than \$227,000 a year.

Steven Kirchman received \$2,038 for his suggestion concerning inspection of tubing and hose assemblies. Previous to his suggestion, these were pressure tested after fabrication, then identified, cleaned, and inspected again. After they were installed in the next assembly, the entire system was leak tested again. Kirchman suggested use of a Craftsman stamp for pressure testing during the early stages, eliminating the need for redundant inspection. First-year savings resulting from Kirchman's suggestion came to \$21,090.

In other awards in December, Frances Navarette received \$1,923 for a suggestion which improved procedures for the manufacturing of hybrid circuit boards, allowing the circuits to be tested before they were permanently cemented.

Also, R. A. Golem was awarded \$1,208 for his suggestion to change the type and

size of bagging material used on all launch tubes, sleeves and cannisters in the cruise missile program. By using a tubular material, both time and material costs were reduced, for an annual savings of \$12,080.

By recommending a change in the method of welding the forward equipment boxes on the transporter erector launcher and launch control centers of the Ground Launched Cruise Missile, Waymond R. Bradshaw saved nearly \$44,000 in labor costs, and received \$4,366 for his suggestion.

Dennis Uhlken received \$919 for his suggestion that the company purchase, at a reduced price, a 40-channel charge amplifier system that was under lease.

## Convair Awarded Atlas-Centaur Upgrade Study

Convair has been awarded a \$500,000 contract from the U.S. Air Force Space Division for a concept definition study of possible systems to be used as the Standardized Launch Vehicle-X (SLV-X) to complement the Space Shuttle.

The four-month study effort will examine upgrades to the company's Atlas-Centaur launch vehicle to provide the capability of placing a 10,000-pound payload into geosynchronous orbit. Maximum use of existing designs and hardware is a requirement of the study.

The Air Force is interested in maintaining a capability of launching satellites using expendable launch vehicles, such as Atlas-Centaur, in addition to the Space Shuttle. This study and a similar one using Titan-Centaur are expected to lead to competitive hardware proposals for several launches a year over a five-year period beginning in 1988 or 1989.



**Electronics Demonstration.** Nearly 50 high-ranking Air Force, Department of Defense and contractor officials attended a recent Electronics Division demonstration on the Modular Automatic Test Equipment (MATE) program. In the photo above, James F. Brown, MATE Demonstration Project Manager, standing, shows the group how Electronics Division's automatic test equipment can be configured to meet MATE standards. MATE is the Air Force program to develop hardware and software standards for automatic test equipment that will be used for maintenance work on all types of aircraft electronics at all levels of maintenance.

## Fort Worth Employees' Ideas Saved \$6.9 Million in 1983

A total of \$6.9 million was saved with ideas submitted in Fort Worth's Employee Suggestion Program in 1983, resulting in a 30 percent increase over the \$5.3 million savings reported for 1982.

A savings target of \$4.2 million had been set for last year.

Participation improved 17 percent, with 6,313 ideas submitted, compared to the prior year's 5,398. There was a 56.3 percent increase in the number of suggestions that were approved, 2,525 compared to 1,616.

Awards totaling \$336,456 were paid to employees for the adopted suggestions.

The division's Cost Reduction program also showed significant improvement last year, with documented savings totaling \$229.3 million or 6.3 percent more than 1982's \$215.6 million. A total of 2,058 Cost Reduction items were documented, up 12.3 percent from the prior year's 1,832.

Fort Worth's 1982 Employee Suggestion Program performance won recogni-

tion for the division as having the best suggestion program in General Dynamics. The 1983 corporate results are not yet available, but Fort Worth again led the other divisions through the first three quarters of 1983.

In the fourth quarter of 1983, Fort Worth's Material Department was the top contributor to the suggestion program with savings of \$974,224. The Subassembly and Fabrication areas were next with \$862,526 and \$720,195, respectively.

Fabrication achieved 261 percent of its participation goal, Subassembly 228 percent and Quality Assurance 193 percent in October, November and December.

The suggestion with the largest savings for the fourth quarter, an estimated \$496,200 in the first year of implementation, was submitted by Greg Bennett, a senior buyer. It proposed a cost-saving change in the way subcontractor-furnished coaxial cables are prepared before delivery to Fort Worth.

The top suggestion of the year was submitted jointly by Sid Fort of Revenue Management and Bill Thompson of Kit Management. It concerned the billing procedure for contract change proposal items and had an estimated first-year savings of \$504,276. The suggesters shared a maximum \$10,000 award.

The 1984 suggestion program savings goal is \$5 million, and the target level of participation is 40 suggestions per 100 employees.

## Land Systems Family Receives Community Award in W. Germany

The family of a Land Systems employee in West Germany recently received a Great American Family Community Award signed by First Lady Nancy Reagan.

The award was presented to the family of Cleophas (Sonny) Crooms, Land Systems Site Supervisor with the M1 Tank Material Fielding Team in Vilseck, Federal Republic of Germany, for "your outstanding contribution as a family to improve your community and to strengthen America." Col. Martin L. Plassmeyer, Commander of the 7th Army Combined Arms Training Center in Vilseck, presented the award.

Crooms' family was selected from about 150 American civilian families living in Vilseck. Three families received awards, one each representing the officer, non-commissioned officer and civilian contingents. The three will be among those American families throughout Europe from which a single Great American Family will be selected. That family will be honored by the President and Mrs. Reagan in a ceremony at the White House. "We're very proud to have received this award," Crooms said, "especially since there are so many American families here that contribute significantly to the community."

The Great American Family award program was instituted last year by Mrs. Reagan and the American Family Society to express appreciation to outstanding families for their service to others and as an inspiration to other families.

Col. James T. Mowain, Chief of the M1 Material Fielding Team, said the "award attests to the quality of personnel provided by GDLS to support fielding in Europe."

"The significant point is the acceptance of the GDLS and other contractor families into the local military and German communities," Colonel Mowain said. "Sonny Crooms is responsible for that



Cleophas (Sonny) Crooms, Land Systems Site Supervisor for the M1 Tank Material Fielding Team, his wife, Virginia, and their two children, Carlotta, 7, and Keira, 22 months.

acceptance. The net effect of the spirit of cooperation has resulted in a total team effort which has concentrated on the tank rather than military or civilian affiliations."

In addition to supporting church and school activities, Crooms and his wife, Virginia, participate in the Hospitality Committee that welcomes new arrivals to Vilseck, the Vilseck Brownie and Girl Scout programs, the Army Community Services, the Officers and Civilian Wives Club, the German and American Club and the Vilseck Gourmet Club.

"Working with the community gives me a great opportunity to be among and meet other people who care," Crooms said, "and working with my wife gives us a better understanding of each other. Also, I think it's good for the children to see their parents working as a team both as a teaching process and to give them a feeling of security."

The Crooms have two daughters, Carlotta, 7, and Keira, 22 months.

# GD World

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## First Air Force Reserve Falcon Goes to Wing at Hill AFB, Utah

The 419th Tactical Fighter Wing became the first U.S. Air Force Reserve unit to operate the F-16 when it formally received its initial Falcon in a ceremony at its headquarters at Hill AFB, Utah, late last month.

The wing's 466th Tactical Fighter Squadron will receive 23 additional F-16s by the end of the year. The men and women of the wing will fly and support the aircraft side-by-side with the many F-16s that are assigned to Active Duty units at Hill AFB.

Sen. Jake Garn, Sen. Orrin G. Hatch, Rep. James V. Hansen and Rep. Dan Marriott were present from Utah's U.S. congressional delegation. Senator Garn, the ceremony's principal speaker, congratulated the 419th Wing for the honor it was receiving. "They don't give that kind of aircraft (the F-16) to squadrons that aren't proficient and highly capable of handling them," he said.

The Senator told members of the unit that they are "one crucial element of strength" in a unified force that must be maintained to preserve the nation's peace. "It is weakness, not strength, that invites attack," he said. Garn added that the 419th Wing's F-16s should be considered "proof of our commitment to meet our responsibilities and stand as a beacon of peace for all mankind." In other remarks, Garn called for increased use of multiyear funding in procuring such vital weapons systems as the F-16.

Tidal W. McCoy, Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations, also addressed the crowd of 1,300 reservists, Air Force personnel and community leaders. He cited the state's legislators for their efforts in making first-line equipment like the F-16 available to the reserves and read a congratulatory letter to the 419th Wing from President Ronald Reagan. The President's letter referred to the F-16 as one of the finest aircraft in the world.

Lt. Gen. Jack Gregory, Commander of the 12th Air Force, and Maj. Gen. Sandy Gill, Commander of the Air Force Re-

serve, were also present. F. A. Curtis, Fort Worth Vice President-F-16 Deputy Program Director, and Rolf Krueger, Fort Worth Vice President-Logistics, represented General Dynamics.

"Today is a milestone in the life of Utah and the Air Force Reserve," said Col. John Closner, Wing Commander. "It is a great accomplishment for Utah to be the location of the first Air Force Reserve squadron of F-16s."

The assignment of F-16s to a reserve unit is a milestone in Total Force, a defense concept providing for full partnership of the Active and Reserve military. The F-16 is already operational with the Air National Guard at McEntire ANGB, S.C.

Besides being the first Air Force Reserve unit to fly F-16s, the 419th Wing is also the last in the entire Air Force to still fly the F-105 Thunderchief, which is being retired.

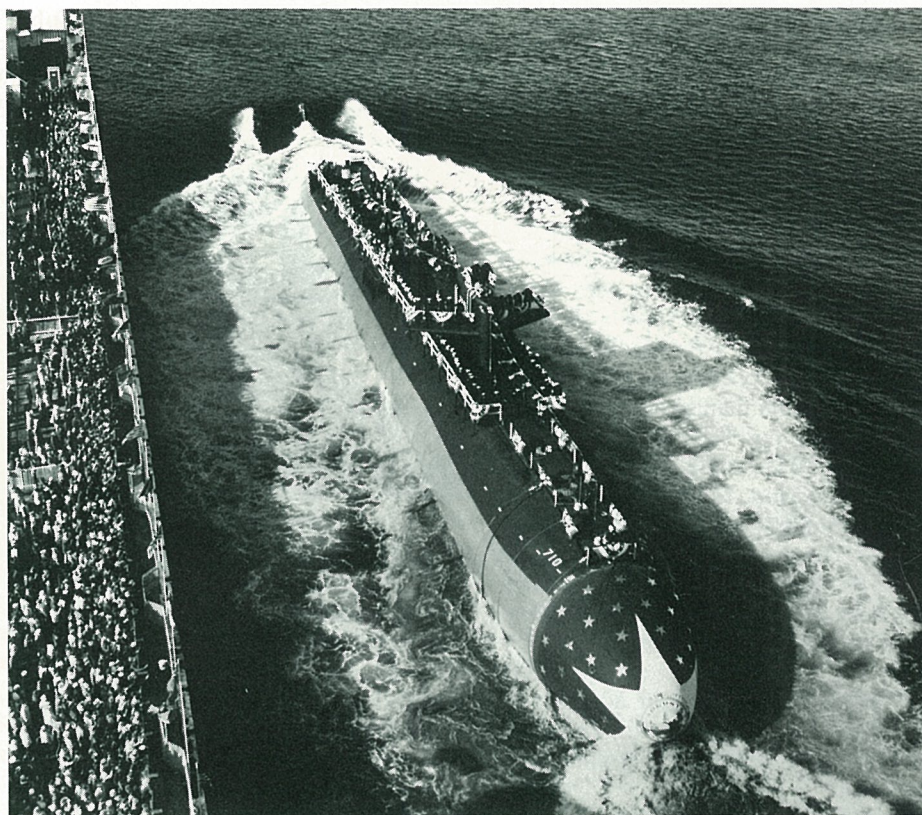
## Texas Air Guard Unit Will Receive F-16s

The 149th Tactical Fighter Group of the Texas Air National Guard at Kelly AFB will become the nation's second Air National Guard unit to be equipped with F-16s, the Department of Defense has announced.

The San Antonio unit is scheduled to receive 24 Falcons to replace its F-4Cs beginning in mid-1986. This will mark the first time the F-16 has been based in the state where it is manufactured.

Texas Gov. Mark White, in a telegram to Lt. Col. Gary R. Walston, Commander of the 149th, said, "It gives me great pleasure to congratulate the 149th on its acquisition of the F-16 — a plane that matches the high performance of our Air National Guard."

The first ANG F-16s are operational with the 169th Tactical Fighter Group of the South Carolina Air National Guard at McEntire ANGB, S.C.



The Augusta Is Launched at Electric Boat

## Fast-Attack Augusta Is Launched

Continued from Page 1

final analysis, a soldier's pack, in President Eisenhower's words, is not as heavy as a prisoner's chains."

"If we are strong," the Senator continued, "we will have the freedom to negotiate a lasting and durable peace with our adversaries. If we are weak, there will be no negotiation, no pipes of peace, only of appeasement."

Discussing the *Augusta*, Cohen called her "a special ship that has as its mission the very gravest of responsibilities, the very noblest of goals — the protection of our homeland and the preservation of our freedom."

Cohen's wife, Diana, christened the ship, sending *Augusta* down the ways to the strains of "Anchors Aweigh" played by the United States Coast Guard Band. Spectators cheered as the 360-foot submarine plowed stern first into the frigid Thames River.

At the beginning of the ceremony, Fritz Tovar, Electric Boat Vice President-General Manager, welcomed spectators, noting that it was 30 years to the day — January 21, 1954 — that the shipyard had

launched *Nautilus* (SSN 571), the world's first nuclear-powered ship.

General Dynamics Board Chairman David S. Lewis, referring to the fact that Electric Boat has delivered the last six submarines to the Navy ahead of schedule, called *Augusta* "the latest in a series of very high-quality submarines being built in record times these days by the talented men and women of Electric Boat."

Lewis introduced Robert Conn, Deputy Under Secretary of the Navy for Financial Management, who, in turn, introduced Cohen. Lewis also introduced Peter Thompson, Mayor of Augusta, Maine's capital, for which the ship was named.

Other dignitaries at the ceremony included Vice Adm. Nils Thunman, Deputy Chief of Naval Operations for Submarine Warfare; Vice Adm. Bernard Kauderer, Commander, Atlantic Submarine Fleet; Rear Adm. James Webber, Vice Commander and Chief of Staff, Naval Sea Systems Command and Capt. Robert Fox, Navy Supervisor of Shipbuilding at Groton.

*Augusta* is the 18th 688-class fast-attack submarine launched at Electric Boat and one of 11 in varying stages of construction at the division.

## USS Georgia Is Commissioned

Continued from Page 1

decade and beyond, allowing our national leadership time to negotiate effective reductions in nuclear arms."

Admiral Watkins said these are "tense and difficult days. I cannot remember any other period when naval power has been more important, or more often used, as the primary tool of national defense."

Admiral Watkins' wife, Sheila, christened the 560-foot, 18,750-ton ship during launching ceremonies at Groton on November 6, 1982.

Southern pride was evident at the commissioning ceremony. A dozen runners carried the Georgia state flag in relays for the 950 miles from the state's capitol building in Atlanta to New London. Averaging an impressive 120 miles a day, they completed the run in eight days. The runners were among more than 100 Georgians, including Gov. Joe Frank Harris, at the ceremony.

*Georgia* was delivered to the Navy January 17th, seven weeks ahead of schedule. She was the sixth consecutive submarine delivered early by the shipyard.



The USAF Reserve's First F-16 Flies Over a Utah Mountain.

## General Dynamics Reports Companywide Improvements in 1983

Continued from Page 1

Lewis noted that operational performance improved in all areas, particularly in marine activities.

During 1983, Electric Boat delivered one Trident ballistic missile-firing submarine and two SSN 688-class fast-attack submarines to the U.S. Navy. In addition, the USS *Georgia*, the fourth Trident submarine, was delivered in January of this year ahead of schedule. "With the awards in November 1983 of contracts for the 11th Trident and two more fast-attack submarines, Electric Boat has a backlog of more than \$5 billion, with contracted work extending into 1990," Lewis said.

Quincy Shipbuilding was profitable in the fourth quarter as work accelerated on the five Maritime Prepositioning Ships planned to support operations of the American Rapid Deployment Force.

Sales and earnings in the company's diversified aerospace group were up substantially in 1983, reflecting increased deliveries on a number of new and mature production programs at the Fort Worth, Convair, Pomona and Electronics divisions.

The Republic of Turkey recently finalized its order for 160 F-16 Falcons, a 10-year program valued at approximately \$4 billion.

The 11 countries which have selected Fort Worth's F-16 to fill their fighter aircraft requirements have placed orders for more than 2,000 aircraft and have indicated firm requirements for more than 3,500. At year-end 1983, 1,107 F-16s had been delivered to the air forces of the United States, Belgium, Denmark, the Netherlands, Norway, Israel, Egypt, Pakistan and Venezuela. Deliveries to the

Republic of Korea and Turkey are scheduled to begin in future years.

Lewis said that the first production F-16C aircraft, incorporating new and advanced weapon system capabilities and enhanced avionics, is scheduled to be delivered from the Fort Worth plant in midsummer.

Convair's Tomahawk cruise missile made substantial progress in 1983. Ground Launched Cruise Missiles for the U.S. Air Force were delivered on time to meet operational deployment schedules in Europe while Sea Launched Cruise Missile systems were installed for the first time on operational Navy submarines and surface ships.

Pomona again had a record year, Lewis said, delivering more than 900 Standard missiles, the mainstay anti-aircraft weapon systems for U.S. and allied navies, while

production rates of the Phalanx ship-defense gun systems and Stinger anti-aircraft weapons continued to accelerate.

Lewis said Land Systems performed well in its first full year as a division of General Dynamics. A total of 756 M1 main battle tanks was delivered to the U.S. Army as workmanship at the Detroit and Lima, Ohio, tank assembly plants reached new high-quality levels. The M1 production rate will increase gradually in 1984, and production of the M60 tanks will continue well into 1985 to meet the requirements of several other countries.

The company's commercial operations in building materials, natural resources and information systems all showed improvement over a year earlier, with the newly acquired El Paso Sand Products Co. performing well during its first nine months as a unit of General Dynamics, Lewis said.



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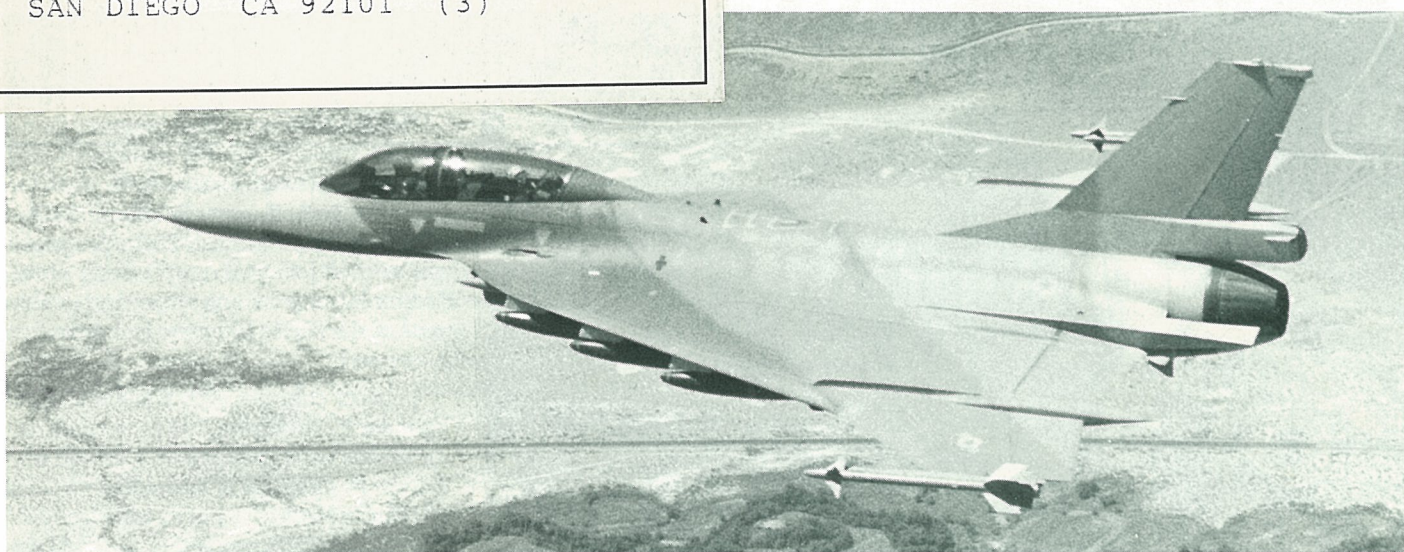
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# World

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March 1984



General Dynamics' Cranked-Arrow-Wing F-16XL

## USAF Will Continue Development of F-16XL

Defense Secretary Caspar W. Weinberger told Congress recently that production of the F-16 multimission fighter should be increased from 150 aircraft annually to 216 and that the U.S. Air Force wants to develop the F-16XL, "a cranked-arrow-wing version that will greatly expand the aircraft's range and payload."

In his annual report on the Defense Department's posture, Secretary Weinberger also noted that modernization

programs for the F-16 will continue so the aircraft will have a night/all-weather, radar missile capability with the introduction of AMRAAM, Advanced Medium-Range Air-to-Air Missiles.

Shortly after Weinberger's announcement, Air Force Chief of Staff Gen. Charles Gabriel said the USAF will further evaluate the F-16XL, which has "demonstrated high potential for follow-on development."

Flight testing of the two F-16XL proto-

types, which has exceeded the 500 flying hour mark, is continuing at Edwards AFB, Calif.

"We are very pleased that the Air Force has announced that the F-16XL has high potential for follow-on development as an advanced version of the F-16 Falcon," said Herbert F. Rogers, Vice President and Fort Worth General Manager.

"The Air Force's strong support for the F-16 can be seen in its current planning requirements for a total of 2,651 Falcons, with production scheduled at rates of from 180 to 216 per year in the second half of this decade," Rogers said. "The cranked-arrow F-16XL is an evolutionary improvement of the standard F-16, and the decision to continue with the development of the F-16XL is good news for the long-term health of the program."

Preliminary indications are that production of the aircraft, which has a longer range and increased payload capability than the basic F-16, would be targeted for 1989 and beyond.

In five years of production, more than 1,100 F-16s have been delivered — within projected cost and ahead of schedule — to the air forces of the United States and eight other nations.

## Navy Commissions Boat Named To Honor Minneapolis-St. Paul

Minnesota-like weather failed to dampen the commissioning ceremonies March 10th for the fast-attack submarine USS *Minneapolis-St. Paul* (SSN 708), Electric Boat's latest addition to the U.S. Navy's fleet.

About 900 guests sat through single-digit temperatures on a pier at the U.S. Naval Submarine Base in Groton, Conn., as they listened to Minnesota Senator David Durenberger, the principal speaker, praise both the ship's crew and a strong defense.

"Americans understand the need for a strong Navy," Senator Durenberger said. "In the 1960s and 1970s, it was all too fashionable to mock or denigrate our military, to blame them for things which we ourselves had set upon them, to forget that we should despise war but honor our warriors." Those days are over, Durenberger said. "Today's huge turnout in this Minnesota weather shows that."

Turning to the submarine's crew, he said their spirit and that of the ship's "can be summarized in five words: independence, imagination, tenacity, power and guts. It takes guts," he continued, "to go aboard a submarine when every instinct is screaming for fresh air and sunlight, evenings at home and a nine-to-five job."

U.S. Army General John Vessey, Chairman of the Joint Chiefs of Staff and a Minnesota native, also spoke to the vital need for a strong defense. Providing an adequate defense, Gen. Vessey said, is best done "by making it self-evident that we

### Update

## Drive To Control Spares' Costs Shows Results

The continuing efforts by General Dynamics to control the costs of spare parts and support equipment have resulted in a number of problem areas being identified and corrective actions taken, according to Oliver C. Boileau, General Dynamics President.

"Since our call for special action in this area earlier this year, special spares steering committees have been formed in the divisions and, in some cases, certain division personnel have been given assignments to look into the overall spare parts acquisition process and initiate corrective action when necessary," Boileau said.

During their detailed reviews of spare parts pricing, division personnel found a number of areas where a change in internal procedures solved many of the problems.

In some cases of apparent overpricing, it was found that the price was correct if the item was manufactured in-house, where complex tooling and extensive test equipment were required. But in the cases of spares of simple design and low quantity — in which General Dynamics adds no value to the items — it is more practical to utilize a subcontractor which specializes in small, out-of-production spare parts. Procedures have been established to bring such cases to the attention of government procurement personnel for their action.

The divisions also found cases that involved simple problems of nomenclature — in which some parts had simplistic descriptions and their titles did not truly describe the parts. As a result, these items appeared to be overpriced but, because of their complex nature, turned out to be rational in price.

In an effort to streamline the spare parts acquisition process, division personnel are now working even more closely with government procurement agencies so as to avoid the problems which have arisen in the past, Boileau said. "Working together we can avoid the so-called 'horror stories' which have received so much publicity over the past several months."

*Continued on Page 2*

## Seven GD Units Earn Corporate Safety Performance Awards

General Dynamics in 1983 made significant improvement in its safety and health programs, and seven divisions, subsidiaries and facilities in 1983 earned special awards for their safety performance during the year.

Arch H. Rambeau, Corporate Vice President-Industrial Relations, said that in 1983 General Dynamics companywide had an overall injury rate that was 34 percent better than the average for the industries in which the corporation is engaged.

Rambeau said that the 1983 injury rate for General Dynamics was 20 percent better than its rate last year, and the company's injury rate in the last two years has improved 34 percent over its figure for 1981.

Rambeau added that General Dynamics' lost workday injury incidence rate also showed significant improvement in the past two years and now is 44 percent better than the industry average.

"We are very pleased that these reductions have put us below the national averages," Rambeau said, "and we believe that this safety record is the result of the increased emphasis on safety and health programs by the corporation in the past few years."

Rambeau said the accomplishments of the past are significant and indicate a capability within General Dynamics to conduct quality safety and health pro-

grams.

"The past success cannot diminish the need for increased involvement, by all employees, in the efforts to improve our overall performance," Rambeau said. "Even one preventable injury or illness is one too many. We can and will do even better in the years to come."

The seven divisions, subsidiaries and facilities which have earned a "Certificate of Achievement for Excellence in Safety Performance for 1983" are Convair, Data-graphix, Electronics, Fort Worth, Marblehead Lime Co., Material Service Corp. and Quonset Point.

William H. Persky, Corporate Manager-Safety and Environmental Health, said, "Each location has compiled a safety record which is significantly better than the national average for similar industries and has conducted an active and comprehensive loss control program which meets or exceeds corporate standards."

Significant improvement in injury and illness incidence rate also was evident at other locations. Persky said that special recognition should go to Electric Boat at Groton, Electro Dynamic, the Abilene facility, Land Systems, Freeman United Underground Operations and the Camden facility.

"Each of these locations demonstrated reduced incidence rates compared to 1982," Persky said.

## Convair, Land Systems To Design Small ICBM Hard Mobile Launcher for USAF

Convair is one of four contractors which have each been awarded a \$5 million contract for design of a Hard Mobile Launcher for the new Small Intercontinental Ballistic Missile being developed for the U.S. Air Force.

This is the second contract awarded to Convair in the program. Previously, the division was one of four companies selected for a Small ICBM concept definition contract.

The new contract calls for Convair to define hard mobile launcher and basing concepts and to construct scale models of the launcher for blast testing to be conducted later.

Land Systems will be working with

Convair on the contract and will be responsible for the crew cab, automotive systems and erector for the launcher.

This first phase of the development program will continue through December 1984. A follow-on phase of the Hard Mobile Launcher competition, for pre-full-scale development, is tentatively scheduled to start late in 1984 and will include design, fabrication and testing of a full-scale prototype.

The Small ICBM is part of the strategic modernization program recommended in April 1983 by the President's Commission on Strategic Forces and approved by Congress last year.



Senator Durenberger

are ready for war."

Electric Boat Vice President-General Manager Fritz Tovar, representing the company, noted that the submarine was the 314th built by the division since 1900, when it delivered the first submarine accepted by the U.S. Navy. "This relationship has produced the world's finest submarines," Tovar said, and called *Minneapolis-St. Paul* "the working proof of this mutual trust."

Other dignitaries at the ceremonies included George Latimer, Mayor of Saint Paul; Donald Fraser, Mayor of Minneapolis, and Captain Robert Fox, the Navy's Supervisor of Shipbuilding and Repair at Groton.

*Minneapolis-St. Paul* was delivered to the Navy on February 17th, one month ahead of schedule. She was the seventh consecutive ship to be delivered early by Electric Boat.



## Starr and Nesbit Get New Posts At Pomona Div.

Sterling V. Starr, Vice President and Deputy General Manager at Pomona, has been named General Manager of the division's Camden, Ark., facility. He succeeds Richard A. Nesbit, who has been appointed Vice President and Program



Starr

Nesbit

Director for the division's new Alternate High-Speed Antiradiation Missile (AHARM) program.

Starr joined General Dynamics in 1953 at Convair as a dynamics engineer. After serving in a number of engineering and program management assignments in aircraft, missile and launch vehicle design, he was appointed Corporate Director of Planning at Corporate Headquarters in 1970.

In 1975, he was promoted to Staff Vice President-Corporate Planning and a year later was appointed Division Vice President-Marketing at Fort Worth. In 1980, he was named Division Vice President and Program Director-FX Export Fighter and Division Vice President and F-111 Program Director in 1981. He assumed his previous position with Pomona in 1983.

A native of Alliance, Ohio, Starr holds Bachelor of Science and Master of Science degrees in Aeronautical Engineering from Ohio State University.

Nesbit joined General Dynamics at Pomona in 1952 as a junior engineer and was subsequently promoted to Test Engineer, Section Head and Manager of Design Engineering. He later held positions of Director of Manufacturing, Standard Missile-I Program Director, Sparrow Program Director and Division Vice President and Director-Self-Defense Missile System before being named General Manager of the Camden facility.

A native of Baton Rouge, La., Nesbit holds a Bachelor of Science degree in Electronic Engineering from Louisiana State University and a Master of Science degree in Systems Engineering from the University of California at Los Angeles.

## Spares Results

*Continued from Page 1*

Boileau said that the progress so far in the spare parts area within the company has been very encouraging but employees need to continue their intensive efforts if the company is to be completely successful in making sure the American taxpayers are getting the correct value for their tax dollars.

As was announced earlier, special Spare Parts Hot Lines have been established for use by employees involved in the spares and support activity, and they should call if a price for spare parts or support equipment looks out of line. All information reported over these hot lines will be kept confidential.

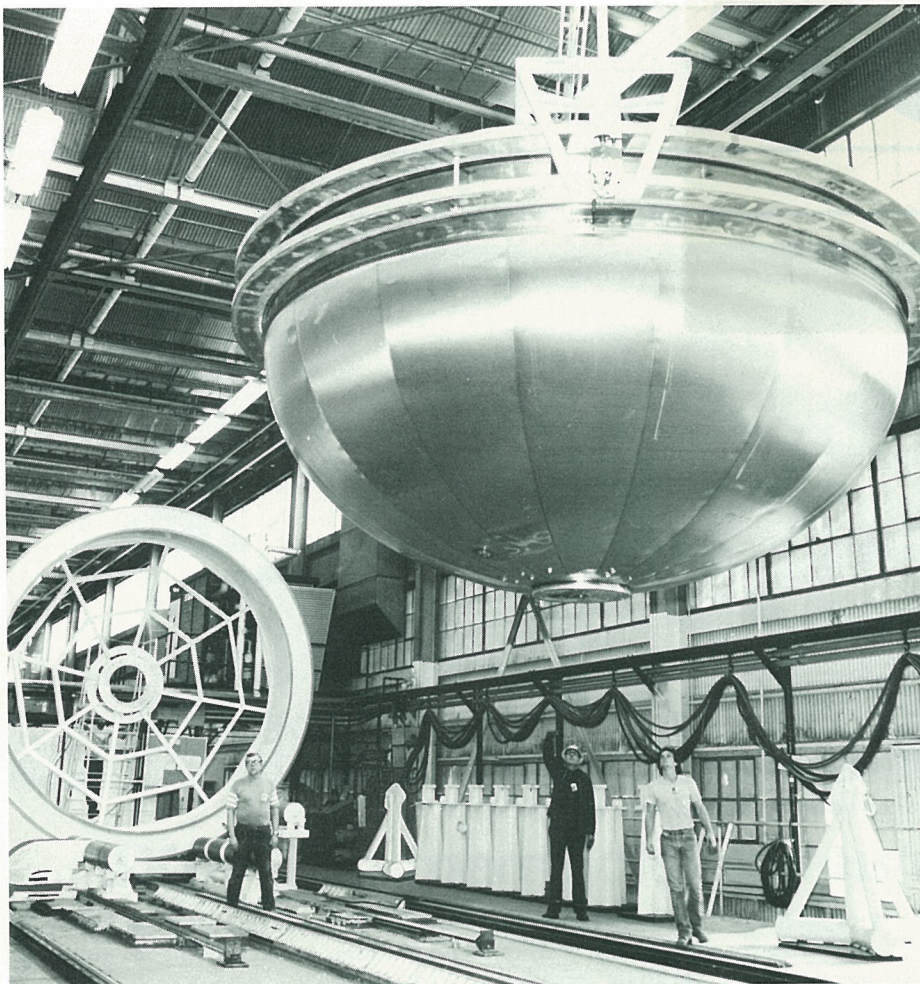
The Spare Parts Hot Lines are:

Convair - 573-5946; George W. Roos, Director Integrated Logistic Support  
Electric Boat - 446-3435; A. J. Gigliotti, Manager Industrial Sales and Service  
Electronics - 573-7164; Carl D. Nelson, Director Product Support

Fort Worth - 777-2777; Rolf Krueger, Vice President Logistics and Support  
Land Systems - 978-5639; R. G. Hill, Director Logistics and Support

Pomona - 620-7511, x3338; Charles E. Reno, Director Product Support and Applications

Corporate Headquarters in St. Louis - (314) 889-8796; Everett C. Gray, Director-Material.



**Ready for Welding.** The front end of the Shuttle Centaur G-Prime fuel tank is moved toward its major weld headstock (background) at Convair's Kearny Mesa plant. The headstock will hold the forward bulkhead in a precise position as the rest of the tank is built up behind it. This particular fuel tank will be used for structural testing. It will be followed by four production Centaurs which will be used as high-energy upper stages to launch NASA and Department of Defense payloads from the Space Shuttle orbiter.

## Scramble Capability of F-16/79 Demonstrated in Recent Tests

The General Dynamics F-16/79 recently demonstrated its record-breaking scramble capability by going from a cold start, with no ground power, to 40,000 feet and twice the speed of sound (Mach 2) in 6 minutes and 11 seconds.

In the test, the engine was started and the brakes were released in 37 seconds, takeoff was completed in 51 seconds, and supersonic speeds were reached within 2 minutes and 48 seconds from the start of the scramble.

Additional flights confirmed the rapid response times. The flights were made from Carswell AFB, Tex., with the temperature in the mid-50s. The F-16/79 was almost combat ready, except that its standard M-61 rapid fire cannon was replaced by special instrumentation for the simulated missions. The aircraft had full internal fuel, two pilots and was armed with two inert AIM-9J missiles.

The tests were made using a modified Litton LN-39 Inertial Navigation System, which was modified to provide 30- to 35-second alignment times, concurrent with the engine's start. As a result, the INS was ready when the aircraft was, allowing

brake release and start of takeoff when the pilot obtained clearance.

Modifications to the F-16/79 to achieve the more rapid response times were minor. The primary change was the addition of a small INS battery to permit simultaneous engine start and INS alignment.

In two quick-reaction simulated intercept missions, the F-16/79 showed nearly equal times in going from start to takeoff in 53 and 51 seconds, respectively, and to Mach 2 at 40,000 feet in 6 minutes and 11 seconds, 65 nautical miles from takeoff.

The goals of the tests were to simplify alert "cocking" procedures, develop pilot scramble techniques and demonstrate alert status-to-takeoff times of under one minute with an operating INS and full avionics package. The F-16/79 alert status requires no external connections or ground support equipment.

The implications of rapid scramble times are manifold. Interceptors can be based farther forward, intercepts can be accomplished more quickly at greater distances from the aggressors' targets, fewer interceptors are needed for a given threat and greater utilization of the interceptor force is possible.

## First B-1B Test Units Delivered By Electronics

The first components of the Intermediate Automatic Test Equipment (IATE) for the U.S. Air Force's B-1B bomber have been delivered by Electronics Division.

The components, called program development stations, are the equipment and computer software that will be used for initial design and development of the avionics testing programs. These programs will be used for off-aircraft testing of the electronics and avionics line replaceable units of the B-1B's offensive and defensive avionics.

Under a contract with Rockwell International Corporation, the prime contractor for the B-1B, Electronics Division is to deliver 14 program development stations systems to Rockwell and its associate contractors and subcontractors that will develop the avionics for the bomber.

By mid-March, Electronics had delivered 10 of the 14 scheduled program development stations and is to deliver the first actual IATE to Rockwell in August.

## Central, Resident F-16 Offices Set At Israel Sites

Fort Worth has established a central F-16 office in Israel to support the Peace Marble II program in which 75 F-16C/D aircraft will be delivered to the Israeli Air Force beginning in mid-1986.

These aircraft constitute a follow-on procurement to the 75 F-16A/B aircraft delivered to the IAF during 1980 and 1981.

The F-16 office in Israel will represent General Dynamics on all F-16 matters. It will provide programmatic, technical and logistics coordination with the Ministry of Defense, the IAF and others.

One of the major responsibilities of the office will be the day-to-day implementation with Israeli industry of the extensive Peace Marble II coproduction program. The central office is located in Tel Aviv and several resident offices are being established at key Israeli facilities.

The director of the F-16 office in Israel is John B. Browder, who was previously located in Europe as Country Manager for Norway and Denmark. The Coproduction Manager in the office is Howard M. Edwards, and the Manager for Administration is Tapley G. Logue. Currently, there are 19 Fort Worth personnel living in Israel.

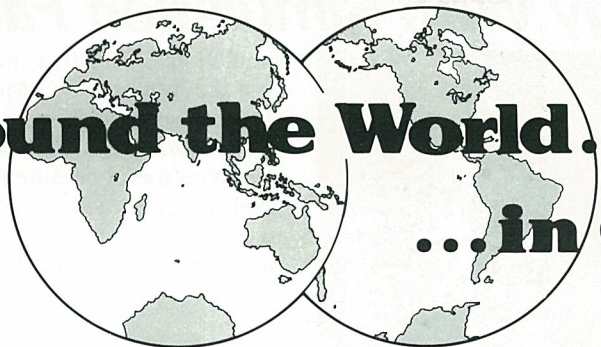
The General Dynamics corporate office in Israel, which is managed by Edward E. Douville, will continue to handle non-F-16 matters for all the other divisions.



The General Dynamics F-16/79



## Around the World... ...in GD



**CHQ:** Thomas L. Shipton joined as Corporate Manager-State & Local Taxes.

**Fort Worth:** Ronald D. Bailey was promoted to Senior Field Service Engineer... Chester D. Baird to Manufacturing Technology Chief... Philip H. Besselièvre Jr., James R. Jackson, Harold W. Johnson and George F. Mothersole to Project Engineer... Joseph B. Brown Jr. and Howard D. Richards to Senior Program Analyst... James L. Crawford and James B. Grant to Senior Industrial Engineer... Donald E. Frazier to Tool Manufacturing General Foreman... Keith Harris to Production Specialist... Richard L. Havens to Material Program Administrator... Larry D. Hedge to Manufacturing Control Supervisor... James R. Vaughan and Lew M. Jobe to Engineering Program Manager... Robert S. Langford to Subcontract Management Representative... David T. Lloyd and Don E. Tarvin to Assistant Project Engineer... Rich Mann to Marketing Manager... Stevie L. Martin to Logistics Engineer... Dick C. McCarty to Engineer... Michael R. McCoy to Production Management Specialist... William J. Newsom and Charles G. Spriggs to Engineering Chief... James L. Plunk to Manager of Tool Manufacturing... T.C. Reed to Manufacturing Control General Supervisor... Cecil E. Russell to Co-Production Management Specialist... Doyle R. Stanford to Superintendent... Kenneth W. Swiney to Foreman... Jack L. Twedell Jr. to Logistics Supervisor... Kenneth W. Watson to Project Manufacturing Support Equipment Engineer... Wayne H. Wayman to Material Cost Coordinator... Mac T. Wilcox to Chief of Quality Assurance... Thomas W. Wood to Senior Field Supply Analyst. At Abilene Facility, Winston Hudson to Manager of Productivity... Steve Caira to Manager of Industrial Engineering and Plant Services... Paul Gradowski to Purchasing Agent.

**Pomona:** Kevin D. Bass, Ronald A. Schmitt, and Robert D. Sims were promoted to Group Engineer... Elizabeth A. Bauer and Ginger L. Steinback to Departmental Assistant... James R. Clausen to Production Support Chief... Charles M. Farr and James A. Wilson to Accounting Supervisor... Jayne E. Fingliss to Industrial Engineer... Joseph P. Gugliuzza to Manufacturing Development Specialist... Scott M. Harvey, Michael H. Maculsay and Todd D. Shallcross to Manufacturing Control Coordinator... Linda S. Lawson to Senior Financial Analyst... Donald H. Lester to Manufacturing Supervisor... Dwain McGary to Senior Project Engineer... Robert B. Westerman to Technical Procurement Administrator... Steven F. Breckner to Manufacturing and Material Control Manager... Thomas J. Furois to Senior Manufacturing Development Specialist... Paul H. Heck to Section Head... James L. Hubbard to Superintendent... Shirleen M. Mason to Senior Engineering Planner... Betty J. McIntosh to Procurement Administrator... Nevin H. Meyers to Quality Assurance Group Engineer... Phillip E. Morlock Jr. to Manager Production Support... James G. Park to Manager Product Quality Assurance... James D. Ramsey Jr. to Project Administrator... Andre Solomon to Project Staff Engineer... Bernard J. Wenzel to Senior Manufacturing Engineer... Billy C. Baxter to Inspection Chief... Alan D. Coleman II, Gary K. Conley and Calvin E. Lemke to Project Coordinator... Donna M. Creamer to Manufacturing Development Engineer... Jacob C. Gray Jr. to Manufacturing & Material Control Chief... Terry L. Hefner and Rickie G. Karnes to Project Representative... Steven S. Henry to Production Control Supervisor... Deborah A. Luckert to Material Control Supervisor. At Camden, Virginia L. Johnson to General Supervisor-Manufacturing... Lawrence R. Hurley to Administrative Accountant... Carlen C. Wilkes to General Supervisor-Quality Assurance... Rodney T. Cole and Larry O. Lindsey to Project Representative... Larry G. Thomas to Systems Analyst... Joseph E. McCaffrey to Manufacturing Supervisor II... Garrett G. Martin to Accounting Supervisor... Cynthia A. Freeman to Senior Cost Control Analyst... Sammie L. Wright to Senior Quality Circle Facilitator... Donald N. Harris to Safety & Security Chief... John P. McGough to Senior Test Engineer... Richard J. Zipf to Senior Administration/Financial Analyst.

**Convair:** Robert K. Mueller has been appointed Manager-Plant Protection and Security.

**Data Systems:** At Western Center, Michael D. Beebe has been promoted to Business Systems Development Manager.

**GDSC:** Daniel Gomez was promoted to Flightline Branch Leader... George A. Washabaugh to Business Manager... Karl W. Meek to Project Coordinator... Peter L. Sterling to Program Manager.

## Negative Process Has a Positive Effect; Every Year It Develops a Profit in Silver

Fort Worth has a precious metal recovery program that is not quite worth its weight in gold; each year it processes an average of 1,400 troy ounces of silver as residue from photographic chemicals and negatives.

A troy ounce of silver is one-fifteenth of a pound and presently sells for about

\$9, and the salvage process last year netted an above-average 1,710 ounces of silver.

Silver bromide, a compound extremely sensitive to light, is used in the emulsion which coats photographic film. When the film is developed, silver is washed away from areas that have had less light exposure. Silver remaining on the film where greater quantities of light have reached creates the dark or "negative" image.

Recovery devices which remove silver from chemical waste solutions are installed on photographic and X-ray processors in various areas of the Fort Worth plant. The processors are used to develop film and prints in Photo Services, negatives in Reproduction Services and X-ray film in Non-Destructive Component Inspection areas. A silver company analyzes the chemical residue that is recovered from the processors and purchases it from Fort Worth for an amount based on the market value of the silver it contains.

## Employee Suggestion Programs Scheduled for Improvements

Companywide Employee Suggestion programs had a record year in 1983, but they will not be permitted to rest on their laurels. General Dynamics currently is working toward the development of new approaches to the current suggestion programs, which are expected to be in effect early next year.

The programs at participating divisions last year saved the company \$14,626,000, a record high, and Arch H. Rambeau, Corporate Vice President-Industrial Relations, said, "The Employee Suggestion programs within General Dynamics have been good programs by several standards established for American industry. However, they can be substantially improved."

Rambeau said new approaches at all the participating divisions will follow a study under way by a task force of division representatives.

In addition, an Idea Advisory Group has been formed. The new group held its first meeting in January at Convair and will meet periodically through 1984 at the different divisions. "The group will act as a clearing house for ideas on how to improve our suggestion programs," Rambeau said. "It will also serve as a listening post for the latest research in this area and will gather information from sources outside General Dynamics."

John C. Kane, Corporate Director-Administration, said the advisory group in turn has established the task force — a special seven-member Idea Team, with employees from the different divisions who have expertise in functional areas.

The task force will prepare a suggestion program model and submit it to the Idea Advisory Group in about three months. "After it is refined, the model will be

shared with the divisions," Kane said. "We expect adoption of this model or many of its important parts by various divisions by January 1985," he said.

The goal of this effort is fourfold — to increase employee participation, to speed up the turnaround time from the time the suggestion is submitted until it is acted on, to speed up the recognition process and to increase productivity and the quality of company operations through the programs.

Kane said that "1983 was a year in transition for most of the division participants because new concepts of eligibility, processing and recognition were introduced." He added that the 1983 suggestion program resulted in record high savings. For the past four years, the savings companywide have been:

1980 - \$ 8,529,924  
1981 - \$ 8,935,296  
1982 - \$10,434,000  
1983 - \$14,626,000

In total savings per division for 1983, Fort Worth led with \$6,865,752. Electric Boat was next with \$3,040,864, Pomona was next with \$2,004,136, and Convair followed with \$1,827,460.

In the ranking of the divisions by the effectiveness of their Employee Suggestion programs, Fort Worth again led last year. Next in order were Convair, Electronics, Pomona, Datagraphix, Electric Boat and Quincy Shipbuilding.

The rankings were made based on six separate factors, which included such categories as the number of new suggestors per 100 employees, the number of suggestions per 100 employees, the number of suggestions adopted for each 100 processed and the savings per employee.

"This was the third year in a row that Fort Worth made the top of the list and once again established a new high in savings," Kane said. "Pomona is last year's winner in the 'most improved' category, and Electric Boat and Electronics deserve special mention for their aggressive efforts to move awards from cash to merchandise."

## Subcontractor's Quality of Work Being Monitored

Fort Worth is participating in a Factory Liaison and Inspection Resources-Electronics (FLAIR-E) program that was established recently to monitor work done at a subcontractor facility where semiconductors for the F-16 and several other major military systems are manufactured.

"FLAIR is a cost-effective approach to assuring the quality of work performed by suppliers whose products are procured by more than one prime contractor," said D. J. (Jim) Talley, Vice President-Quality Assurance. "In FLAIR, several prime contractors of major systems join together to hire one representative who provides in-plant inspection and surveillance at a subcontractor facility. Since all the prime contractors purchase parts from the subcontractor, this is considerably cheaper than having each firm send its own representative."

Fort Worth organized the original FLAIR program, which monitors work performed by foundry suppliers. The pilot program has proven successful and has significantly reduced inspection costs while improving the quality of the items being purchased, said John L. Evans, Manager of Procurement Quality Assurance at Fort Worth. The division also participates in two FLAIR programs involving manufacturers of electromechanical equipment.

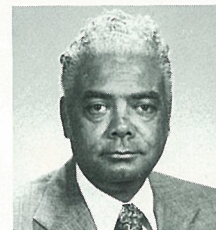
## Hyman Named Convair Director Of Productivity

Henry Hyman has been appointed Director of Productivity for Convair. He had previously been Director of Engineering Business Management.

In his new position, Hyman will be responsible for planning and coordinating the division's productivity and quality improvement programs in manufacturing, engineering and administration, including management information systems.

Hyman joined General Dynamics at Electric Boat in Groton, Conn., in 1956 and moved to Convair in 1979 after a one-year assignment as Special Assistant to the Executive Vice President-Aerospace at the Corporate Office.

Hyman holds a Bachelor of Science degree in Structural Engineering from North Carolina Agricultural & Technical State University.



Hyman

## GD World

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## Savings and Stock Investment Values

Salaried	January 1982	January 1983	January 1984
Government Bonds	\$ 2.8106	\$ 3.3840	\$ 3.6786
Diversified Portfolio	2.0370	2.6402	3.0635
Fixed Income	1.2953	1.4459	1.6206
Hourly			
Government Bonds	2.8075	3.3817	3.6768
Diversified Portfolio	2.0801	2.6948	3.1254
GD Stock	\$26.0000	\$38.0000	\$53.0000



# Fort Worth at the Forefront of Technology With Simulation Facility

By Joe Stout

Until recently, there was only one way to get reliable proof that a new aircraft design, flight control system or avionics system was going to provide the predicted capability in flight: fly it.

Now there's a safer, cheaper way: flight simulation . . . and Fort Worth is at the forefront of this new technology through continuing expansion of the Research & Engineering Department's Flight Simulation Laboratory.

"Flight simulation is being used at Fort Worth to evaluate both avionics and airframe designs long before the company is committed to flying them in either prototypes or demonstrators," said Jack Drewett, Manager of the laboratory. "Basically, a flight simulator consists of a cockpit, a visual scene projected on some sort of a screen, such as the inner surface of a dome, and a computer complex to drive the visual scene as a function of the commands received from the cockpit.

"To complete the loop, we must have a pilot in the cockpit to generate the commands that constitute the desired flight objectives."

Fort Worth is halfway through a five-year plan for expanding the Simulation Laboratory with \$23 million in company and \$7 million in U.S. Air Force funds. The completed facility will be able to support on-going programs as well as help Fort Worth win future business.

## Simulated Teams

"Starting in about two years, we will be able to run very complex simulations where we actually have a complete air-to-air scenario," Drewett said. "Pilots in cockpits inside two simulation domes will be able to fight as a team against four or five adversaries. The adversary pilots will be operating intercept control stations that will allow them to control the images of enemy aircraft being projected inside the domes."

The laboratory now has four simulators, three of which can be run simultaneously for different test programs, said Don Smart, Chief Systems Engineer for the facility. There are two 24-foot domes that



**Simulated View.** Company pilots view a typical night scene from the cockpit of the Flight Simulation Laboratory's two-place simulator for the Multinational Staged Improvement Program of the F-16.

allow images to be projected above, below and around the cockpits; one of these is dedicated to the Advanced Fighter Technology Integration/F-16 (AFTI/F-16) program, while the other is being configured for a new program.

There is also a flat-screen setup that is used for handling-qualities and ride-qualities simulations. This station was used for takeoff, landing and high angle-of-attack studies when F-16XL flight controls were being developed.

A fourth simulator station with a two-place cockpit is being used for Multinational Staged Improvement Program (MSIP) studies.

## New Dome Under Construction

One of the projects included in the five-year plan is a 40-foot simulation dome that is currently being built. Its features include an elaborate projection system with three projectors for air-to-ground scenes and five air-target projectors; the 24-foot domes currently have two projectors each but are in the process of being expanded to four projectors each.

Display, control and computer rooms are among facilities that have already been added to the laboratory.

In planning the laboratory, Fort Worth designers borrowed from the USAF's experiences in conducting such large-scale simulations as the Advanced Medium Range Air-to-Air Missile (AMRAAM) operational utility evaluation that concluded in 1982. Also contributing to the plans were results of studies at Williams AFB, Ariz., on the effectiveness of visual-only simulators versus motion-base systems.

## Visual Systems

Most airlines use motion-base simulators, where the cockpits actually move, and less complex visual systems than Fort Worth. Because it is difficult to replicate all the maneuvers of a high performance fighter using motion base, engineers at Fort Worth are, instead, recreating the "feel" of flight with sophisticated visual effects.

In the Williams AFB study, pilots "flew" missions in cockpits that were equipped with both motion base and complex visual

simulation. Evaluators found they could turn the motion-base systems on and off and the pilots didn't know the difference.

The AMRAAM operational utility evaluation was useful because its scenario had an element that will probably be common to simulation needs for all future aircraft programs — the capability to simulate threats that are beyond the pilot's visual range.

## Avionics 'In the Loop'

Aircraft systems that are under development are initially modeled with software in the simulator computer. When prototypes become available they are substituted for the computer models, thus allowing the new hardware to be tested in a simulated flight environment.

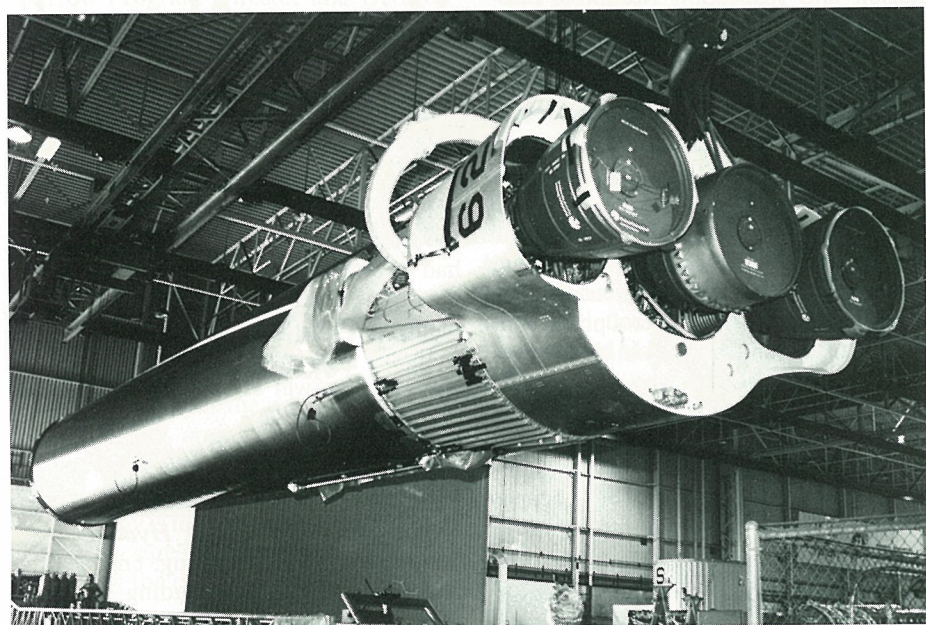
"The capability to perform functions either inside or outside the computer is one of the simulator's most useful assets," said Bill Booton, Manager of Avionics Engineering.

Avionics functions, whether they take place in a computer or in the real hardware, are manifested by the data shown on the cockpit displays and by changes in the out-of-cockpit visual scenes that are projected to simulate aircraft movement.

The out-of-cockpit scenes, including targets, terrain and background such as clouds, are drawn by engineers in the Simulator Support group and stored in computer memory. "The scenes are built in computer language with geometric building blocks we call polygons," said Smart. "The result is a full-color video picture composed of trees, buildings, roads and terrain features."

In addition to research and development activities, the laboratory's cockpits have been used to familiarize company pilots with new aircraft configurations before they go into the field to fly with the systems, said Dave Palmer, Fort Worth's Chief Test Pilot.

"The simulators allow test pilots to get used to takeoff and landing qualities and with how the aircraft will handle when you get it up in the air," added Alex Wolfe, who practiced with the simulators prior to taking the AFTI/F-16 and two-seat F-16XL on their first flights.



Convair's First New Generation Atlas-G Centaur

## New Generation Atlas/Centaur Shipped to Florida Launch Site

The first of a new generation of Atlas/Centaur launch vehicles was shipped recently from Convair to the Eastern Test Range at Cape Canaveral, Fla.

The first vehicle, designated Atlas/Centaur AC-62, will be used to launch another Intelsat V communications satellite later this year. It will use the new Atlas-G booster, which is 81 inches longer than the Atlas booster used with earlier Atlas/Centaurs. The increased length provides room for additional propellant and gives the launch vehicle a larger payload capacity.

The new vehicle also incorporates several changes in the Centaur upper stage. The original peroxide control system has

been replaced with an all-new hydrazine reaction control system, which is used for final control of the spacecraft's orbit or trajectory. In addition, the Centaur main engines are now tank pressure-fed, eliminating the costly, complex pumps used previously.

The effect of these changes has been to raise the payload capability of Atlas/Centaur from 4,800 pounds to 5,200 pounds into geosynchronous transfer orbit.

This new generation Atlas/Centaur will provide the baseline for future commercial launch vehicles, which, under a recently announced government policy, could be sold directly to users rather than through NASA.

## USAF Falcon Unit Sets Sortie Record During Exercise in Spain

The U.S. Air Force's 10th Tactical Fighter Squadron, deployed from Hahn AB, West Germany, to Zaragoza AB, Spain, set a new high mark in the operation of the 50th Tactical Fighter Wing's F-16s when the unit and its accompanying aircraft maintenance technicians produced 80 sorties in under 10 hours.

The 50th Tactical Fighter Wing deploys each of its three squadrons to Weapons Training Detachment bases, such as at Zaragoza, at least twice each year. Weather and range limitations in northern Europe make it difficult for the wing's pilots to get the training they need. The southern climates offer more consistent weather and better range availability.

The deployments are designed to test the unit's capability to produce a large number of sorties with a minimum of maintenance problems. The technicians on the 10th Tactical Fighter Squadron's deployment worked two overlapping 10-hour shifts to produce the desired results. The maintenance section had 18 aircraft ready for the effort. Fourteen of the F-16s

were the primary aircraft with four acting as spares.

Originally, the plan called for a total of 70 sorties; however, the aircraft were performing so well that 10 sorties were added during the day to up the total to 80.

The operation produced 99.8 flying hours for the deployed unit, each mission lasting approximately 1 hour 15 minutes.

## USAF Thunderbirds Set 1984 Schedule

The F-16 Falcon-equipped U.S. Air Force Air Demonstration Squadron, known as the Thunderbirds, has announced its schedule for 1984. The schedule includes a number of shows near General Dynamics facilities:

- April 8th:** Little Rock AFB, Ark.
- April 14th:** Blytheville AFB, Ark.
- May 5th:** Langley AFB, Hampton, Va.
- May 19th:** Chanute AFB, Rantoul, Ill.
- May 20th:** Scott AFB, Belleville, Ill.
- July 21st-22nd:** Dayton, Ohio
- July 28th:** Wurtsmith AFB, Oscoda, Mich.
- July 29th:** Loring AFB, Limestone, Maine
- August 25th:** Pease AFB, Portsmouth, N.H.
- August 26th:** Rickenbacker ANGB, Columbus, Ohio
- October 27th:** Edwards AFB, Rosamond, Calif.
- November 4th:** George AFB, Victorville, Calif.
- November 10th:** Nellis AFB, Las Vegas, Nev.
- November 12th:** Vandenberg AFB, Lompoc, Calif.

## Computer User Group Elects Gant Chairman

Donna Gant of Data Systems' Central Center has been elected chairman of the Ada-Jovial User's Group. Gant is Software Engineering Chief of the Center's Sacramento ALC Support group.

The 2,000-member Ada-Jovial User's Group is the national organization that helps guide the direction of Ada and Jovial High Order Computing Programming Languages throughout the aerospace industry and the U.S. Air Force.



## Two Air Force GLCM Tests Are Successful

The U.S. Air Force successfully carried out two important tests of the General Dynamics Tomahawk Ground Launched Cruise Missile (GLCM) this month at the Utah Test and Training Range.

On April 3rd, a Tomahawk was launched from its transporter erector launcher (TEL), inclined at an 11-degree upward angle in a test covered by U.S. and international media representatives. Two days later, a second GLCM successfully transitioned to cruise flight after being launched from the same TEL. Both tests were conducted by the Air Force Test and Evaluation Team as part of a series of Follow-on Test and Evaluation flights over the western Utah desert.

The tests marked the first time that two live Tomahawk rounds were loaded in the TEL to demonstrate simultaneous launch capability. In both flights, the GLCMs flew approximately two-hour missions and were recovered by using the missile's parachute recovery system.

Rear Adm. Stephen J. Hostettler, Director of the Joint Cruise Missile Project, in testimony before the Procurement & Military Nuclear Systems Subcommittee of the House Armed Services Committee, recently said, "The most significant accomplishment of the (GLCM) program this past year was the achievement of the GLCM Initial Operational Capability in December 1983 at Greenham Common, United Kingdom. Deployment of GLCM has both political and military impacts and is of national importance to NATO's deterrent capability and American security objectives."

## General Dynamics Proposes Change in FX Policy

General Dynamics has proposed a change in U.S. export fighter policy to make the F-16A rather than the F-16/79 its "intermediate" FX candidate for sales abroad.

The suggestion was advanced recently at a Washington hearing of the House Foreign Affairs Committee's subcommittees on International Security and Scientific Affairs and on East Asia and Pacific Affairs.

Appearing on behalf of General Dynamics were Otto J. Glasser, Vice President-International, Washington Operations, and Herbert F. Rogers, Vice President and Fort Worth General Manager.

After State and Defense Department officials said the four-year-old FX policy was being reassessed because of "unwill-

## Trident Alabama Launching Set

Electric Boat will launch *Alabama*, the nation's sixth Trident missile-firing submarine, on May 19th.

The sponsor will be Mrs. William L. Dickinson, wife of the U.S. Representative from Alabama's Second Congressional District. Congressman Dickinson will deliver the principal address.

The launching will take place in the graving dock of the division's Land Level Submarine Construction Facility at Groton, Conn.

*Alabama* (SSBN 731) is the first submarine and the fifth U.S. Naval ship to bear the name. Her predecessors were two 19th Century sidewheel steamers and the battleships BB 8 and BB 60. BB 8 was a part of President Theodore Roosevelt's "Great White Fleet" and later saw service in World War I. BB 60 earned nine battle stars for her actions in both the Atlantic and Pacific Theaters during World War II.

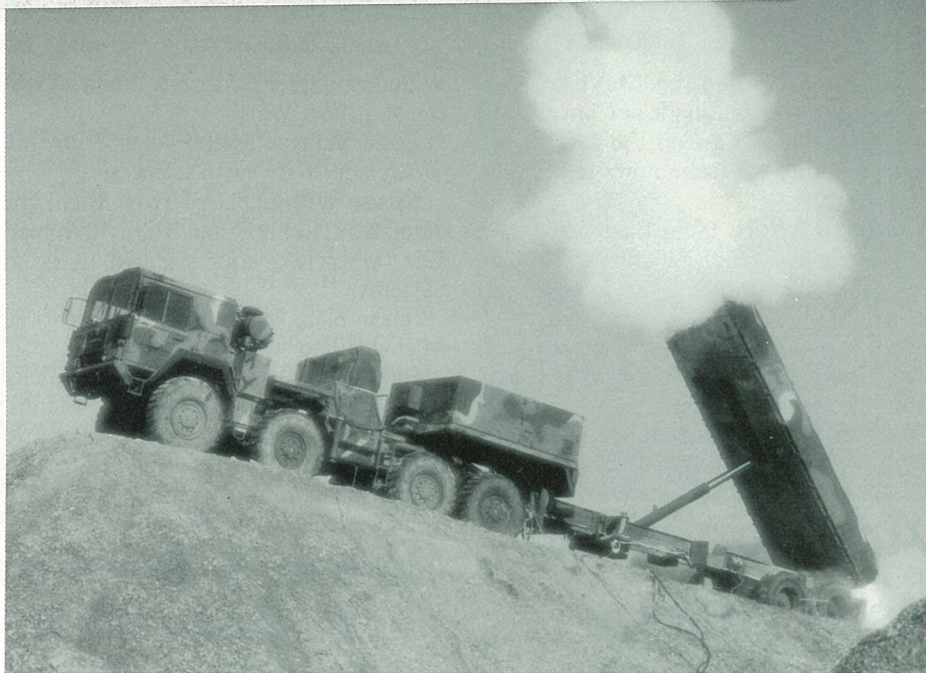
**GENERAL DYNAMICS**  
Pierre Laclède Center, St. Louis, Missouri 63105

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April 1984



Successful Ground Launch of Tomahawk

In his testimony, Admiral Hostettler noted that the success rate for Navy and Air Force Tomahawks during 1983 testing had risen to 88 percent (15 of 17 flight tests were successful) and that the highest quality missiles were being delivered to the military. "We have tested all variants in the operational environment, and we know that they work and work well. No other weapon in the world today can fly at the distance demonstrated by Tomahawk

and strike targets with its degree of accuracy," he said.

Since deployment to the United Kingdom, the GLCM weapon system has been deployed at the Comiso Air Station in Italy with future main operating bases planned for Belgium, the Federal Republic of Germany and the Netherlands. The basic Air Force GLCM unit consists of four TELs, 16 Tomahawk missiles, and two launch control centers, which provide communications, command and control.

ingness" of potential customer countries to accept the F-16/79 or Northrop's rival F-20, Glasser and Rogers made these points:

- The F-16C with advanced avionics and weapons systems is now in production and will enter the U.S. Air Force inventory this summer. Thus, the F-16A with its Pratt & Whitney F100 engine rather than the FX version with the General Electric J79 engine fits into the "intermediate" export guidelines — that cost and performance characteristics be greater than those of the F-5E and less than the F-16 that is in production for the USAF.

- The F-20, which began its FX life as an F-5G which also conformed to those guidelines, has been upgraded and modernized so that some of its systems' technologies now equal or exceed those of the F-16A. Witnesses for Northrop and the government also made this point.

- There is only a "marginal difference" between costs of an FX and an F-16A; there is "ample excess capability" at Fort Worth to meet F-16A customer needs; ease of maintenance has been proved

through some 500,000 flight hours involving 1,143 aircraft; there is assured growth potential, and there are taxpayer benefits through recoupment of research and development costs. The hearing focused largely on fighter export policy for Southeast Asia, where Singapore has asked for eight F-16/79 aircraft and Thailand has requested a squadron of 20 F-16As.

The Singapore request, first and only order for either FX candidate, is pending before Congress. Thailand's request is still under consideration by the Administration.

Richard L. Armitage, Assistant Secretary of Defense for International Security Affairs, said the government had actively supported the FX fighter concept but since none had been sold, except to Singapore, "a reassessment of the policy might be in order."

"It is clear that sales of advanced fighters would expand U.S. production and theoretically, at least, reduce the unit cost of our own procurement," Armitage said.

Continued on Page 4



F-16A Falcon Proposed as Intermediate Export Fighter

## Secretary Orr Praises F-16, F-111 in Report

Two Fort Worth-designed and -built aircraft, the F-16 and F-111, received high praise in Air Force Secretary Verne Orr's recent annual message to Congress.

Referring to the F-16, Secretary Orr wrote:

"The multimission F-16 Fighting Falcon continues to exceed our expectations. It performs superbly in the air-to-air and air-to-surface roles and meets desired flying goals and sortie and mission-capable rates. The F-16 will keep pace with the threat through such improvements as AMRAAM, advanced sensors and better electronic warfare equipment. Continued support for the Multinational Staged Improvement Program is necessary to incorporate needed improvements and provide systems growth.

"The FY 85 request of \$4.1 billion for 150 aircraft and initial spares continues the last increment of the four-year, multiyear procurement. Our F-16 buy will replace aging F-4s, modernize the Air Reserve Forces and provide modern tactical fighters."

In another section of the message, Secretary Orr said of the FB-111:

"The FB-111A is a key element of our strategic forces. It can provide accurate low-altitude delivery at night and in poor weather. Although it is now assigned a nuclear mission, the FB-111A's conventional weapons capability matches that of the F-111s assigned to our tactical forces. Given the dual capabilities of the FB-111A, we will consider transferring these aircraft to the tactical forces as the ATB (Advanced Technology Bomber) deployment draws closer. We plan to use the F/FB-111 force throughout and possibly beyond the 1990s.

"Avionics modernization, engine work and escape capsule modification are included in this program. We also need funds for avionics intermediate shops to replace the current unreliable and costly test stations. The avionics modernization program and the avionics intermediate shop program will significantly expand the capabilities of the F/FB-111 force."

## Tours of Orient Offered in F-16 Offset Program

Six special "Window to the Orient" tours of Korea, Japan, Hong Kong and China are being offered to employees, their families, retirees and friends of General Dynamics.

The company is making the tours available as part of a program to help Korea offset the cost of its purchase of F-16 aircraft, the first of which will be delivered in 1986.

Korea is and will continue to be an important customer for General Dynamics and a market for many of the company's major products. Korea has purchased 36 F-16s, and a follow-on buy is a strong possibility. In addition, General Dynamics has been involved with Korea in the development of a new main battle tank.

These important contracts have provided hundreds of jobs for General Dynamics employees, and the company in turn is trying to do all it can to contribute to the economic well-being of Korea.

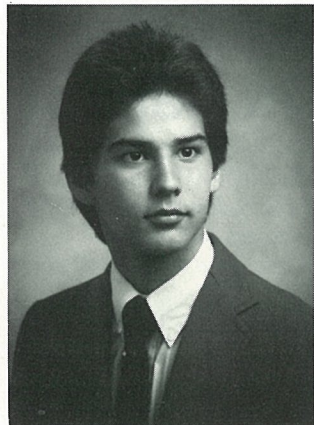
"With the cooperation of Korean Air Lines, Korea's Dongbu Travel Service and Ask Mr. Foster Travel Service, General Dynamics has put together a high-quality tour at a price that is considerably lower than the cost of similar commercially offered tours," said Richard A. Bowhay, Corporate Manager, Offset and Business Development.

The tour price includes round-trip transportation from either Los Angeles or New York, first-class room accommo-

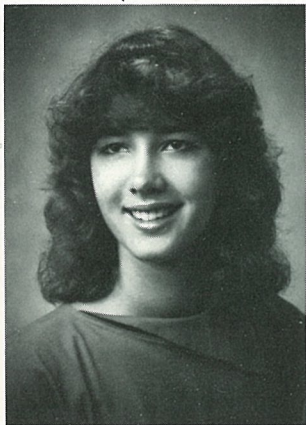
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## National Merit, Achievement Scholarships Awarded to Six Students



MacQuarrie



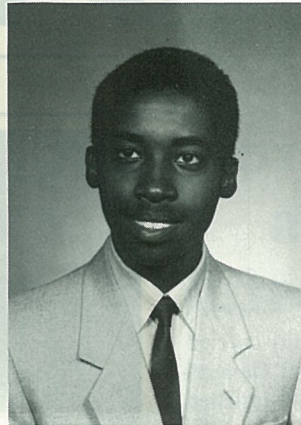
Vitols



Williamson



Wohler



Manns



Wood

Six children of General Dynamics employees have won company-sponsored four-year college scholarships to begin in September.

Four of the winners have been awarded National Merit Scholarships, and two have been awarded National Achievement Scholarships. The scholarship competition is administered by the National Merit Scholarship Corporation.

The National Merit and Achievement Scholarship winners are:

**Bryan E. MacQuarrie**, 18, of San Diego, Calif., the son of Ronald A. Mac-

Quarrie and T. Aline Tani McVicker. His mother is a text processor at Convair.

Bryan plans to attend the Massachusetts Institute of Technology and study engineering.

**Valda J. Vitols**, 18, of La Jolla, Calif., the daughter of Hugh T. Kratz and Karin S. Vitols. Her father is an engineer at Convair.

Valda plans to attend the University of California at Los Angeles and study business administration.

**Leslie C. Williamson**, 18, of Azle, Tex., the daughter of Paul R. and Betty I.

Williamson. Her father is a financial specialist at Fort Worth.

Leslie plans to attend Texas Tech University and study earth sciences.

**Susan Wohler**, 17, of Troy, Mich., the daughter of John F. and Marilyn Wohler. Her father is a staff scientist at Land Systems.

Susan plans to attend the University of Michigan and study biological science.

**Billy H. Manns**, 18, of Warren, Mich., the son of Billy H. and Mary L. Manns. His father is a supervisor at Land Systems.

Billy plans to attend the University of Michigan and study premedicine.

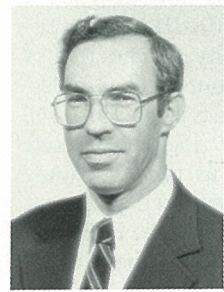
**Cheryl L. Wood**, 18, of Ladue, Mo., daughter of Frederick L. and Erma L. Wood. Her father is Vice President of Contracts and Pricing at Corporate Headquarters.

Cheryl plans to attend Northwestern University and study liberal arts.

The four-year scholarships provide for a minimum of \$1,000 a year up to \$3,000 a year, depending on the cost of tuition and the family's financial status.

Each year, General Dynamics sponsors four National Merit and two National Achievement Scholarships for outstanding students who are children of General Dynamics employees.

## Geary and Hatzis Are Appointed Div. Vice Presidents at Quincy



Geary



Hatzis

Robert B. Geary has been appointed Division Vice President-Engineering, and Constantin Hatzis has been appointed Division Vice President-Operations at Quincy Shipbuilding.

Geary joined General Dynamics in 1965 as an engineer at Electric Boat. He held positions in Research and Development

and Program Management prior to becoming Director of Engineering at Quincy in 1978.

Geary received a Bachelor of Science degree in 1963 and a Master of Science degree in 1965, both in Naval Architecture and Marine Engineering, from the University of Michigan.

Hatzis joined General Dynamics in 1975 as Manager of Operations-Charleston Facility. He became General Manager of that facility in 1977 and, in 1978, transferred to Quincy as Assistant General Manager. Since 1981, he has been Assistant General Manager-Operations.

Hatzis received a Master of Science degree in Mechanical Engineering in 1964 from the Technical University of Aachen, West Germany.

## Three GD Executives Head Local U.S. Savings Bond Campaigns

Three General Dynamics executives have been named chairmen of their local U.S. Savings Bonds drives.

Oliver C. Boileau, General Dynamics President, is the Chairman of the 1984 Savings Bond Campaign for the St. Louis Region; Herbert F. Rogers, Vice President and Fort Worth General Manager, is Chairman of the Tarrant County Bond Campaign, and John E. McSweeney, Vice President and Convair General Manager, is the 1984 Chairman for the San Diego Metropolitan Area.

"Savings Bonds purchased through Payroll Savings Plans are important to employees, because they are a secure, competitive and convenient method of personal investment for the future," Boileau said. "In addition, they are important to our country, because they represent a noninflationary source of funds to our Federal government."

The three executives are organizing campaigns to help local companies with their Savings Bond drives to encourage employees to purchase bonds or increase their monthly allocations to purchase bonds through the Payroll Deduction Plan.

Recent changes in Savings Bond interest formulas have established a market-based rate that can increase interest paid for bond holders. The new Series EE Bonds interest is set at 85 percent of the interest of the Treasury's marketable securities. In spite of market fluctuations, Savings Bonds held five years can earn no less than 7.5 percent interest, and the U.S. Treasury will replace them if they are lost or destroyed.

Meanwhile, Savings Bond drives at General Dynamics' divisions and subsidiaries are under way and are following a highly successful corporate campaign in 1983. Last year's results were announced recently.

Convair, with an employee participation of 93.2 percent, won the Gold Award for Best Savings Bond Campaign in the companywide 1983 U.S. Savings Bond drive.

Pomona, with an employee participation of 91 percent, won the Silver Award for Best Savings Bond Campaign, and Certificates of Excellence, awarded for achieving over 90 percent participation, were won by Convair, Pomona, General Dynamics Credit Corporation and Data-Graphix.

The corporate average of employee participation in the 1983 drive was 64 percent. In 1982 it was 59 percent.

The Gold Award for Volunteer of the Year was won by Peggy Zimmerman, a systems analyst at Pomona who designed the division's campaign incentive award. Cowinners of the Silver Award were Jodie Manuel, a secretary in Material Operations, and Lorraine Place, an executive secretary in Cruise Missile Production, both of Convair.

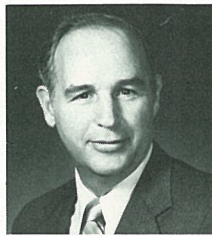
**Take  
stock  
in America.**



## Herbert E. Berry Named Division V.P. For Engineering at Electric Boat

Herbert E. Berry has been appointed Division Vice President-Engineering at Electric Boat. He will report to Fritz G. Tovar, Vice President and Electric Boat General Manager.

Berry, with more than 31 years experience at Electric Boat, began in 1952 as a junior engineer on the design of USS *Seawolf*, the U.S. Navy's second nuclear submarine. He subsequently held a num-



Berry

ber of major engineering management assignments and, since February 1983, has been Assistant General Manager-Engineering. Prior to that, he was Director of Nuclear Engineering.

A 1951 graduate of the United States Merchant Marine Academy with a Bachelor of Science degree in Marine Engineering, Berry earned a Master of Science degree in Mechanical Engineering from the University of Connecticut in 1963. He is a registered Professional Engineer in the state of Connecticut.



FB-111A Arrives at Fort Worth for Avionics Modernization

## FB-111 Received in Fort Worth's Avionics Modernization Program

The U.S. Air Force recently delivered an operational FB-111A to Fort Worth to serve as the trial installation aircraft for the FB-111 Avionics Modernization Program. The airplane will receive all AMP modifications during the next 18 months and is scheduled to undergo ground and flight testing beginning in mid-1985.

After testing by company personnel, the modified airplane will be delivered to the Sacramento Air Logistics Center, Calif., for a 12-month flight evaluation period.

The first phase of the program will be an on-aircraft mock-up of AMP avionics and associated installations as an aid to completing design of the integrated system, according to Jim Humphries, F-111 AMP Program Manager. The work, mainly involving the aircraft's crew station

and forward equipment bay, will be performed in the F-111 Restoration Area at the end of the F-16 assembly line.

Actual hardware will be installed on the aircraft in place of mock-up AMP equipment beginning in early 1985.

The aircraft being used in the program is FB-111A No. 19, which had been assigned to the 509th Bomb Wing at Pease AFB, N.H.

After the trial installation program, AMP modifications will be made to update the bombing/navigation systems of the entire FB-111A fleet. This will include the integration of new computers and software, modified radars and other equipment. Fort Worth was awarded the AMP contract late last year.



## Around the World... ...in GD

**CHQ:** Phillip W. Bush and Alexander M. Clawson joined as Internal Auditor . . . Marina G. Whigham as EDP Auditor . . . Michael J. Wilson as Senior Auditor . . . James G. Hamilton as Subcontract Auditor . . . Ronnie Minassian as Auditor . . . Keith D. Schofield transferred from DSDCC and was promoted to EDP Auditor . . . Sally P. Herr was promoted to Financial System Manager . . . Marlene E. Carver to Corporate Manager-International Administration . . . Byron D. Vermillion to Corporate Manager-Financial Planning.

**Fort Worth:** Jessie G. Arey, Lawrence J. MacDonald, Richard N. Schnacke Jr. and Arthur W. Wikoff were promoted to Engineering Chief . . . James R. Artz to Foreman . . . Jerry D. Beckham to Tool Planning Chief . . . Joe F. Briseno to Project Factory Specialist . . . Phillip M. Bunting to Manufacturing Technology Supervisor . . . Robert L. Cheaney to Manufacturing Technology Engineering Specialist . . . Jerry D. Cobb to Project Manager . . . Robert K. Eby Jr. and Alford G. Werner to Senior Program Analyst . . . Jerry E. Francis to Quality Assurance Field Engineer . . . John L. Hurst to Tool Design Supervisor . . . Catherine E. Inches to Engineer . . . Laurie M. Johnson to Field Engineer . . . Bruce E. Meyer and Donald L. Van Noy to Field Service Engineer . . . Jerry E. Miller to Numerical Control Manufacturing Specialist . . . Martin E. Norman to Tooling Supervisor . . . William G. Nutt to Industrial Relations Chief . . . Roger A. Parsley and Robert S. Wiggins to Industrial Engineering Chief . . . Timothy J. Roels to Director of Product Support . . . Bobby E. Taggart to Quality Assurance Engineering Specialist . . . Douglas S. Vining to Tool Design Chief . . . David L. Walker to Buyer.

**Pomona:** James L. Cagle was promoted to Material Control Supervisor . . . Randy B. Matthews to Senior Provisioning Representative . . . Jerome L. Trageser to Manufacturing Engineer . . . Raymond K. Wong to Senior Manufacturing Engineer . . . Dorothy N. Fagg to Research Engineer . . . Leroy Gaines to Manufacturing Supervisor . . . Hugo H. Hennings to Engineering Specialist . . . Lee G. Sims Jr. to Senior Quality Assurance Specialist.

**Convair:** Joseph F. Truncale, Robin A. Birchell, Jimmie D. Blodgett, Frank W. Chabza, Dale A. Davidson, Clarence P. Hicks Jr., Roy A. Krava, Allan H. Cooper, Kenneth L. Nauta and Louis P. Eidenmiller were promoted to Group Engineer . . . Darlene C. Doubt and Arthur Wrightson III to Accounting Supervisor . . . Thomas H. Buckley, Archibald Gay, Grant A. Cooper, Anthony DeCouteau, Richard F. Bausbeck and Daniel C. Swanson to Engineering Chief . . . Kamalendu Ganguly and Edwin L. Foreman to Operations Supervisor-Industrial Engineering . . . James E. Gillespie, Kenneth J. Koval, Michael L. Stubbs, John C. Ascencio, Dale D. Bond, Ronald W. Edgerton, Thomas J. Neitzel, John P. Ezell and Donald L. Smith to Operations Supervisor-Manufacturing . . . Frank L. Jenkins III to Operations Supervisor-Manufacturing Control . . . Paul E. Kane to Superintendent . . . Thomas W. Brown to Estimating Chief . . . Christine A. Clark to Finance Chief . . . Larry B. Gilmore and Phillip P. Shepard to Master Scheduling Supervisor . . . Robert L. Holcomb to Master Scheduling Chief . . . Patrick O. Houle to Operations Supervisor-Plant Engineering . . . Raymond Roberts and Phillip A. White to Operations Supervisor-Transportation . . . Dennis E. Sesler to Financial Supervisor . . . Mark D. Thomas to Operations Supervisor-Plant Services . . . John P. Grando to Industrial Engineering Chief . . . Amy J. Howard to Drafting Supervisor . . . Anthony Angelo to Operations General Supervisor-Manufacturing . . . David B. Chizlett to Operations Product Manager . . . Charles R. Harter to Base Operations Manager . . . Agnes M. Kratz to Engineering Services Supervisor . . . Clayton B. Till to Base Launch Operations Supervisor.

**Electronics:** S. R. Brandon, William A. Owens and Le Moyne Truesdell were promoted to Superintendent . . . Boyd E. Burnett to Operations Project Manager . . . Mike W. Colson to Financial Specialist . . . Robert Klann to Senior Engineering Specialist . . . Kathleen R. Liberto to Contracts Analyst . . . Edwin R. Pryor III to Production Test Supervisor . . . Bo G. Worobec to Quality Control Engineer . . . Cindy G. Morgan to Senior Administrative Engineer . . . Jackie A. Marshall, A. J. Anderson, G. L. Emmert and K. Zolkoski to Operations Section Head . . . Z. L. Holdin to Project Manager . . . E. L. Marshall to Cost Estimating Supervisor . . . M. R. Perry to Planning and Control Section Head . . . R. W. Sanger to Estimating Manager . . . M. E. Thornton to Material Operations Section Head.

**Data Systems:** At Western Center, Wilton T. Holmes was promoted to Engineering Software Chief . . . Mary J. Morris to CAD/CAM Chief . . . Bart A. Kosko and Alan J. Thill to Senior Software Engineer . . . John M. Pryor, Samuel T. Wong and Ben T. Wilson to Engineering Software Supervisor . . . Dan J. Schultz to Site Manager . . . Russel H. Owen to Software Design Specialist . . . Peter E. Chandler, Judy D. Illeman, Virgil D. Rhoades and Rebecca A. Shofner to Software Engineer . . . Khoa D. Hoang, Richard D. Lewis, Erin M. McLaughlin and John Rutledge to Programmer/Analyst. At Central Center, John A. Baum, Jacqueline M. Beck, Madonna M. Bortle, Travis M. Haddock, Elizabeth M. Hall, John C. Holzer, Leon J. McAllister, Rebecca D. Ragsdale, Jude A. Ricard, Elaine Y. Rice, Gere V. Streun, Eliot B. Swiger, Phillip S. Trojanowski Jr., Dale A. Wheeler, Richard G. Berger, Donald E. McCluskey, Edward W. Scott IV, David Stokely and Louis R. Tiner to Software Engineer . . . T. Craig Fletcher, Brenda B. Aly, Gregory A. Johnson, Quanah F. Montgomery and Ann Pasket to Computer Systems Analyst . . . Bobby L. Alderson to Computer Systems Specialist . . . Mary G. Bailey, Robert L. Joseph, Brenda G. Arnett, Scott R. Gedlinske, Danny R. Huber, Beverly A. Wiest and Karen L. Wright to Senior Programmer/Analyst . . . Linda K. Robb to Senior Software Engineer . . . Donna F. Druley, Lawan R. Loggins, Connie S. Moise, John A. Bani to Programmer/Analyst. At Eastern Center, Michael H. Jansen to Computer Related Training Manager . . . Wilfred W. Rabideau to Operations Services Chief . . . Richard M. Mastrandrea to Software Engineering Specialist . . . Walter O. Clauson to Software Design Specialist . . . Charles A. Kraus, Edward R. Pellegrini, Michael A. Shea and Michael P. Stanley to Computer Systems Specialist . . . David Burns to Senior Software Engineer . . . Carol J. Hussey, David C. Randall, Dennis Wojdyla, Susan M. Tokarz, Paul DeLucia, Steven J. Szafran, Donna J. Leone, Teresa M. Burbank and Samuel F. Voight Jr. to Computer Systems Analyst . . . Kenneth J. Walsh to Senior Programmer/Analyst . . . Stephen A. Mark, Thomas P. Miller and James H. Vogel to Programmer/Analyst . . . Donna M. San Juan to Buyer . . . Michael V. Annichiarico to Software Engineer.



**Record Load.** Forty-seven M1 tanks leave the Detroit Arsenal Tank Plant in the largest shipment of M1s ever sent from one plant. Forty of the tanks went to Fort Hood, Tex., a new high for the number shipped to one location. Two Conrail engines were needed to pull the load of 6,000 tons.

### Savings and Stock Investment Values

Salaried	February 1982	February 1983	February 1984
Government Bonds	\$ 2.8369	\$ 3.4452	\$ 3.6938
Diversified Portfolio	1.9593	2.7977	2.8787
Fixed Income	1.3063	1.4584	1.6360
Hourly			
Government Bonds	2.8335	3.4427	3.6922
Diversified Portfolio	2.0002	2.8558	2.9316
GD Stock	\$23.0000	\$41.8750	\$48.0000

## Aircraft Technical Editor Writes The Book, Then Teaches from It

When it comes to knowing the value of technical manuals, Ron Hutcherson is in an enviable position — he has the advantage of seeing the manuals from both a producer's and a user's point of view.

As a technical publications editor in Fort Worth's Logistics Department, Hutcherson writes and edits F-16 weapons loading manuals. As a master sergeant in the Air Force Reserve, he uses technical manuals to teach aircraft armament system maintenance courses to Active Duty airmen.

Hutcherson is the editor 50 weeks a year at Fort Worth and the teacher two weeks a year during his Active Duty at Lowry AFB, Colo.

The Air Force gets an added benefit from his expertise. While he is at Lowry, regular USAF instructors have first-hand access to the author of many of the manuals on the subjects they teach. Because of this, Hutcherson is known among his fellow instructors at Lowry as "the man who wrote the book" on weapons loading.

Hutcherson said, "I talk to the other instructors at Lowry at least once or twice a day about questions they have concerning the F-16 Technical Orders."

"The last time I was there I was able to give them some idea of what to expect on the third revision of the F-16A/B weapons Technical Orders, which they'll be receiving soon," Hutcherson said. "The next time I go, I'll be able to tell them something about the books that will be coming out for the F-16C and D."

Hutcherson spends his two weeks on Active Duty in the Individual Mobilization Augmentee program, which is part of the Total Force concept of Active Duty and Reserve units working together. The IMA participants differ from other Reservists in that they work directly with regular Air Force units, rather than with other Reserve organizations.

Senior Master Sgt. Thomas Miller, IMA coordinator at Lowry, said Hutcherson is an excellent example of Total Force concept in action.

"His civilian career combines well with his IMA Reserve duties, and he acts as a good liaison between the civilian community and the military," Miller said. "He brings new ideas to his job as a Reservist and takes the military point of view back to his community."

## Seven Employees Get Eagle Awards

Seven Pomona employees have received the division's coveted Eagle Awards for Excellence. The awards recognize superior achievement and contribution in all phases of the division's activities.

The seven recipients are: Larry Frazier, for Excellence in Engineering Innovation; Jim Park, Excellence in Quality Assurance Management; John Palmer, Excellence in Program Management; John Esslinger, Excellence in Procurement Management; Rae Rottman, Excellence in Business/Administration, and John Padilla and Ray Smith, Excellence in Production Management.

## GD World

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Zlotnik





**Collier Honored.** The SS Energy Independence, the coal-fired, self-unloading collier designed and built by Quincy Shipbuilding, has been named one of the 10 top engineering achievements of 1983 by the National Society of Professional Engineers. The 665-foot-long, 32,366-ton vessel was delivered to New England Electric last August and has been carrying coal from ports in Pennsylvania, Maryland and Virginia to power stations in Massachusetts. The collier was nominated for the award by the South Shore and Western Middlesex chapters of the Massachusetts Society of Professional Engineers.

## GD Proposes Revised Policy

*Continued from Page 1*

Issues to be considered, he said, are the Soviet threat in the area and the ability of countries to pay for and maintain the aircraft they desire.

"Although one might argue that acquisitions of advanced fighters would create distortions in force structures and impose heavy financial burdens, we have always found it difficult to press our perceptions and standards on friends and allies located halfway around the world, in close proximity to potential aggressors," Armitage said.

William Schneider Jr., Under Secretary of State for Security Assistance, noted that the U.S. had informed the Persian Gulf nations of Kuwait, the United Arab Emirates and Qatar that they could obtain an advanced American fighter "once they absorb the FX."

"To date, no Gulf state has requested an FX aircraft," Schneider said. "The Gulf states have procured or are considering the purchase of modern French or British aircraft. Two Gulf countries have requested a U.S. commitment to sell a follow-on U.S. fighter (F-16C/D) later in the decade."

## Tours of Orient

*Continued from Page 1*

dations, breakfast daily, three lunches and one dinner and sightseeing. All admission fees, taxes and service charges are included. Each tour is fully escorted by local English-speaking guides and an Ask Mr. Foster Travel Service tour escort.

Six tours are scheduled for 1984. A brochure describing the tours has been mailed to General Dynamics employees, retirees and key F-16 subcontractors, and information meetings will be held at most General Dynamics locations.

For departure dates, cost and other information on this vacation program, please contact the divisional Tour Coordinators, listed below, who have recently completed a trip to Korea and are familiar with the tour.

Convair: Judi DuPuy - Ext. 39916

DatagraphiX: Jim Stubbs - Ext. 5651

Electric Boat: Phil Stein - Ext. 5578

Electronics: Belle Onorato - Ext. 7089

Fort Worth: Bill Neal - Ext. 72715

Land Systems: Rosemary Mansfield - 497-7334

Pomona: Margie Dolezal - Ext. 2208

All other locations: Freda Monk - Corporate Office Ext. 8372

## F-16XL Team Receives Awards

Good Design/Fine Workmanship awards were presented recently to members of the Fort Worth F-16XL team at Edwards AFB, Calif., in recognition of their excellent performance during the F-16XL Flight Test Program.

Gordon Smith, Manager of F-16XL Test and Evaluation, said the talent and dedication of the 40 Maintenance, Quality

Control and Instrumentation technicians were major contributors to the successful completion of all test program objectives. "We couldn't have done it without everyone working together," he said.

The program stayed within its original schedule and budget while the two demonstrator aircraft completed twice as many flights as originally planned.

## GD Flashback

### Mass-Produced Valiant Was a Top Quality Product

The Vultee Valiant was the standard basic trainer for American pilots in World War II, but it was more than an operational success — it was also a prime example of quality and productivity.

The Valiant was used by the Army Air Corps/Army Air Forces, as the BT-13 and BT-15, and by the Navy, as the SNV (Scouting, Training, Vultee), and 11,537 of them were used to teach basic flight training to most Army, Navy and Marine Corps pilots. Of the total, 9,537 went to the USAAF and 2,000 to the Navy.

The BT-13 Valiant was produced in a number of variants, but they differed only in equipment details, and the BT-15 differed from the BT-13 only in the use of a different engine with the same horsepower.

The BT-13 was designed in 1939 by Vultee Aircraft, Inc., which merged with the Consolidated Aircraft Corp. in March 1943. Mass production of the Valiant was continued by the renamed Consolidated Vultee Aircraft Corp. through the summer of 1944.

The Valiant seemed to stretch wartime productivity to the limit when 123 BT-13s took off from Vultee Field at Downey, Calif., on one day, setting a record for deliveries of military aircraft in a 24-hour period that probably will never be matched.

The Valiant was a ruggedly constructed airplane designed to withstand the severe strains put on it by student pilots. It was known by thousands of pilots as the "Vultee Vibrator" because it had double the power of the Boeing-Stearman biplanes in which they had received their primary training.

The first production BT-13 had a Pratt & Whitney R-985 Wasp Junior engine, with 450 horsepower, giving it a maximum speed of 173 miles per hour, a range of 560 miles and ceiling of 16,500 feet. It could take off over a 50-foot-high obstacle in less than 1,200 feet and land at an easy-going 53 miles per hour.

The BT-13 had a wingspan of 42 ft. 2 in. and a length of 28 ft. 8 in. It weighed 4,498 pounds and could carry a useful load of 1,033 pounds. The student pilot sat in the rear cockpit and the instructor in the front.

A solid design, the BT-13 fuselage was built of welded steel tubing covered forward, covered with detachable metal panels and of semimonocoque, stressed skin aft. The cantilever (unbraced) low wing was of all-metal stressed skin, except for fabric-covered ailerons and flaps. The cantilever tail section was all metal, except for the fabric-covered, movable control surfaces. It had a fixed, unbraced landing gear and a steerable tail wheel.

The impressive production record of the Valiant illustrates how a quality product can follow disappointment. In 1939, Vultee lost a competition for a new advanced trainer but followed immediately with a basic trainer that hit the jackpot. The prototype of the Valiant — equipped with streamlined wheel pants — with the company designation of Vultee 54-A, flew for the first time on July 28, 1939, and the Army Air Corps was so impressed that the following month it ordered a whopping 300 Valiants — without the wheel pants — which were given the military designation of BT-13.

The production BT-13 was first test-flown on Feb. 18, 1940, and deliveries began in June 1940. By the time the first production order was finished in the winter of 1940, Vultee was tooling up to turn out 300 additional trainers a month.

Vultee followed in 1940 with the BT-13A for the Army Air Corps, but the Navy liked the plane and ordered 1,350 as the SNV-1. The next variant was the BT-13B, for the Army, with 650 going to the Navy as the SNV-2. Finally, in 1941, Vultee produced the BT-15 solely for the renamed Army Air Forces. It was similar to the BT-13 variants except that it was given a Wright R-975 engine of 450 horsepower, replacing the Pratt & Whitney of the BT-13/SNV.

The career of the number one production airplane (tail number 0811) illustrated the durability, solid construction and sound design of the Valiant. The first production plane went into service at Kelly Field, Tex., in March 1940, and later was transferred to Gunter Field, Ala. Late in 1943, when the 10,000th Valiant came off the Consolidated Vultee production line, "Old Eight-Eleven" had logged 3,600 flight hours, flown an estimated 568,000 miles and had worn out six engines — all without a serious accident. It was no wonder that Valiants continued in military service until as late as 1950, 10 years after "Old Eight-Eleven" was delivered.



One of Consolidated Vultee's 11,537 Valiants

## DatagraphiX Announces New Products

DatagraphiX has announced a new microfilm reader product line featuring a full range of price and performance capabilities and backed by an exclusive 36-month limited warranty. The new readers join the MicroMATE™ portable reader and the 1500DL reader printer.

"The DatagraphiX reader line meets all microfiche applications — for COM or source document, desktop or work station, in the office or in the field," said Gary Pack, Micrographics Program Manager. "The DataMATE™ 400 series readers offer value, style and reliability at a competitive price," Pack said. "The DataMATE 414 provides full-size viewing of COM or source document images and the DataMATE 475 offers three-quarter-size viewing."

The DataMATE 500 series readers, with superior optics and modern design, provide high-contrast viewing for COM and source document applications where quality is essential, Pack said.

"The DataMATE 600 series readers, with their rugged metal construction, are tough enough to handle work-station environments with hour-after-hour viewing that's easy on the eyes," Pack said. "There are models for COM and source document applications, image rotation for jacketed source systems and a roll-film option to handle cartridges or spools. There is even an aperture card model for full-frame viewing of engineering drawings."

DatagraphiX has been a leader in information management systems since 1955.

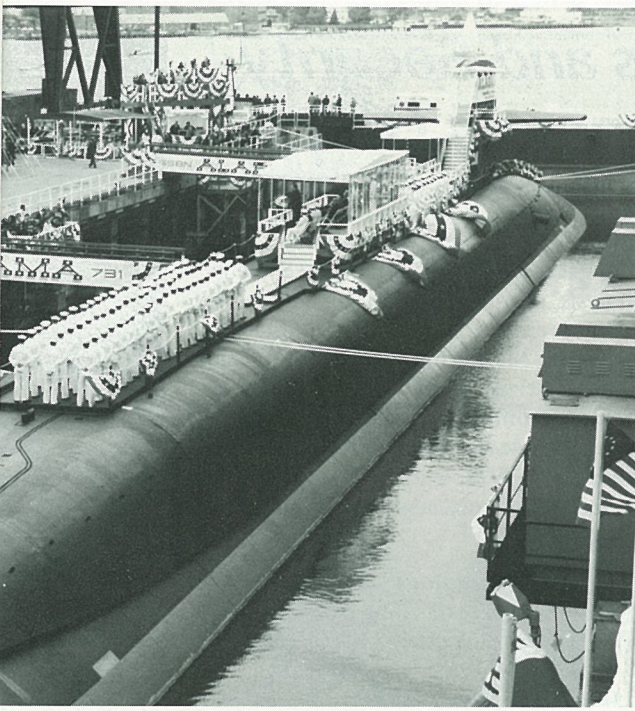


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**GENERAL DYNAMICS**  
Electric Boat Division

**Sixth Trident Christened.** The nation's sixth Trident missile-firing submarine was christened the Alabama in a ceremony at Electric Boat May 19th. The ship, which floated in the huge graving dock of Electric Boat's land level facility at Groton,

Conn., was christened by Mrs. Barbara Dickinson. In the photo at right, she smashes a bottle of champagne against the submarine's superstructure as David S. Lewis, General Dynamics' Chairman and Chief Executive Officer, looks on.

# GD World

Vol. 14 No. 5 1 May 1984

## Annual Meeting

### Chairman Lewis to Shareholders: GD Continuing Fine Performance

David S. Lewis, General Dynamics Chairman and Chief Executive Officer, told shareholders May 3rd that the company is continuing the accomplishments and performance of 1983, a record year in sales and earnings.

Lewis told shareholders attending the company's annual meeting in Fort Worth that the pace set in 1983 "continued to accelerate in this first quarter of 1984."

"All divisions and subsidiaries continued their fine on-schedule performance in the design and production of high quality products and services," he added.

Lewis said first quarter earnings for 1984 were \$77.5 million, or \$1.52 per share, compared with \$56.8 million, or \$1.03 per share, in the first quarter of 1983.

Sales in the quarter were \$1.86 billion compared to \$1.83 billion in the same period in 1983, Lewis said, and the company's total funded and unfunded backlog was \$18.5 billion, very close to that of year-end 1983 and \$700 million higher than at the same time last year.

"We believe our steady growth in sales and earnings over the past decade is the result of the heavy emphasis and funding for research and development and new facilities provided by our Board of Directors," Lewis said. "Through the years, we have been able to obtain all the money we could effectively use for both, with the result that our record of obtaining major

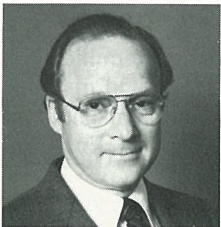
new programs in a highly competitive environment has never been better."

For example, Lewis said, over the past few months —

- Convair, along with three other companies, won study contracts for design and development work on the Air Force's new Small Mobile Intercontinental Ballistic Missile, informally called "Midgetman." Convair, again with three other

*Continued on Page 4*

### Duesenberg Named VP-General Counsel, Succeeds Retiring Lynn



**Duesenberg**



**Lynn**

Robert H. Duesenberg has been elected Vice President and General Counsel of General Dynamics. He succeeds Edward E. Lynn, who has retired after serving in that position since 1971.

In making the announcement, David S. Lewis, Chairman and Chief Executive Officer, said, "In his years of outstanding

service to the Board of Directors, the company and its officers and employees, Mr. Lynn compiled a remarkable record of success. His contributions will be long remembered."

Lewis said that Lynn would continue to make his valuable experience and legal expertise available to General Dynamics on a consulting basis.

Duesenberg, 53, joined General Dynamics in June 1983 as Staff Vice President and Deputy General Counsel. Prior to assuming that post, he had been serving as Vice President, General Counsel and Assistant Secretary of Pet Incorporated, St. Louis. He joined Pet in 1965

*Continued on Page 4*



**Directors' Tour.** Members of the General Dynamics Board of Directors combined their attendance at the Annual Meeting at Fort Worth with a tour of the plant and an inspection of company-produced aircraft. Viewing an F-16, with an F-111 in the background, are, left to right; Herbert F. Rogers, Vice President and Fort Worth General Manager; Richard E. Adams, Executive Vice President and a Director; Director Harvey Kapnick; James R. Mellor, Executive Vice President and a Director; George A. Sawyer, Executive Vice President and a Director, and Director Milton Falkoff.

## Trident Alabama Is Christened In Ceremony at Electric Boat

The ballistic missile submarine fleet is leading the way toward modernization of this nation's nuclear deterrent force.

So said Alabama Congressman William L. Dickinson, ranking minority member of the House Armed Services Committee, during the christening of the sixth Trident submarine, *Alabama* (SSBN 731), May 19th.

Congressman Dickinson was the principal speaker for the event at Electric Boat's Land Level Submarine Construction Facility at Groton, Conn. He told some 3,000 guests and spectators that the other two legs of the nuclear system triad — the B-52 bomber and the Minuteman missile — "are obsolescent."

Discussing the age of nuclear weapons, the Congressman said:

"For example, 75 percent of our strategic nuclear capability is carried on plat-

forms (ships, planes and missiles) that are 15 to 20 years old. On the other hand, 75 percent of the Soviets' nuclear capability is carried on platforms that are 5 to 10 years old."

"As we continue our modernization," Dickinson said, "the SSBN fleet is leading



**Main Speaker.** Congressman William L. Dickinson of Alabama addresses the 3,000 guests and spectators.

the way. . . . These submarines are the most effective nuclear submarines of their type in the world today. They are quieter, faster and possess more firepower than the boats they replace. When the D-5 missile system is installed, the United States will have the capacity to strike and destroy the most hardened targets while deployed in a much larger area of ocean.

"The relative invulnerability of a quiet Trident submarine deployed somewhere in a vast ocean area contributes to an exceptional level of stability to our nuclear forces and, as a result, establishes a high level of deterrence."

Dickinson added that the people of Alabama "want a strong, secure America. They recognize that our way of life has to be protected . . . It is my judgment that they wholeheartedly support the deterrent potential represented by this great boat."

Addressing the crew of the *Alabama*, Dickinson said: "I hope that God will bless you and this great vessel and that you will never have to fire a shot in anger."

The *Alabama* was christened by Dickinson's wife, Barbara, who smashed a bottle of champagne on the after edge of the superstructure of the ship, which was floating in the land level facility's huge graving dock. The crowd cheered and applauded as the U.S. Navy Northeast Band struck up the traditional "Anchors Aweigh" and the ship's whistle blew.

At the beginning of the ceremony, Electric Boat Vice President and General Manager Fritz Tovar welcomed spectators.

"We have thousands of . . . very important people with us today," Tovar said, ". . . and they are the men and women of the Navy, Electric Boat and our suppliers who have combined their talents to build this great ship we will launch today, so I

*Continued on Page 4*

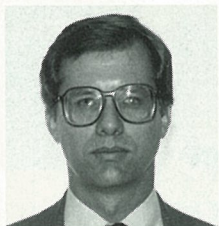


## Financial, Facilities and Security Posts Filled at Corporate Office

Four appointments to posts at Corporate Headquarters have been announced. They are: Paul W. Steckley, Corporate Director-Financial Planning; Dean W. Olney, Corporate Director-Financial Systems; William T. Rushton, Corporate Director-Facilities, and William I. Ferrier, Corporate Director-Security.



Steckley



Olney

In his new position, Steckley will have responsibility for financial activities related to marine, resources, Land Systems, Datagraphix and General Dynamics Services Company operations.

A native of Philadelphia, he joined General Dynamics in January 1983 as Corporate Manager of Financial Planning, with responsibility for Electric Boat and Pantheon financial activities.

Prior to joining General Dynamics, Steckley served in various financial analysis and supervisory positions with the Ford Motor Company and was a submarine officer in the Navy for six years.

Steckley received a Bachelor of Science degree in Mathematics from Pennsylvania State University in 1967 and a Master of Business Administration degree in Finance from the University of Colorado in 1972.

Olney will work with the divisions to review and upgrade the effectiveness of financial systems, ensure integration of financial controls into the system and coordinate financial systems efforts and the exchange of information between the divisions.

Olney joined General Dynamics at Electronics in 1976. He joined the Controller's staff at Corporate Headquarters in 1979 as Corporate Manager-Financial Systems Analysis, his previous position.

Olney earned a Bachelor of Science degree in Marketing from San Diego State University in 1974 and a Master of Business Administration degree in Marketing Science and Finance from the same university in 1976.



Rushton



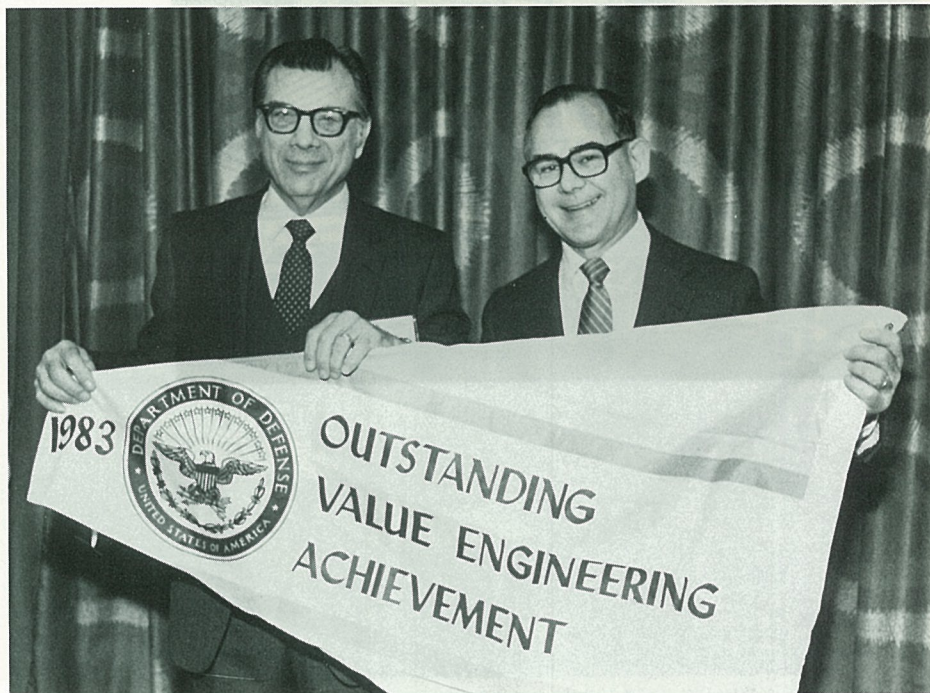
Ferrier

Rushton joined General Dynamics Corporate Headquarters from the General Electric Company, where he held management positions in facilities since 1976. His previous position at General Electric was Manager-Facilities in the Space Systems Division.

Rushton was awarded a Bachelor of Science degree in Building Science from Clemson University in 1975 and a Master of Science degree in Management Science from the same university in 1976.

Ferrier, a native of Holyoke, Mass., served for 21 years with the U.S. Marine Corps, with responsibilities in counterintelligence and security. His most recent assignments included Director, Department of Naval Science and Senior Marine Instructor and Director of Marine Corps Counterintelligence (worldwide).

Ferrier earned a Bachelor of Science degree in Police Science and Criminal Law from Michigan State University in 1960 and a Master of Arts degree in Higher Education from George Washington University in 1978.



**Valued Award.** John A. Mittino, Assistant Deputy Under Secretary of Defense for Production Support, and Ted Webb, Division Vice President-F-16 Programs, display the pennant awarded to Fort Worth by the Department of Defense.

## U.S. Department of Defense Cites Fort Worth for Value Engineering

Fort Worth has been honored as the U.S. Air Force recipient of the Department of Defense's Contractor Value Engineering Achievement Award for 1983.

A plaque and a pennant were presented to the division recently by John A. Mittino, Assistant Deputy Under Secretary of Defense for Production Support. They were accepted by Ted S. Webb Jr., Division Vice President-F-16 Programs. The presentation ceremony was held during the American Defense Preparedness Association's Conference on Profitability and Resource Management in Arlington, Va.

Value Engineering is an organized effort to analyze the functions of systems, equipment, facilities, services and supplies to achieve the lowest life-cycle costs consistent with required performance, reliability, maintainability, interchangeability,

product quality and safety.

The award to Fort Worth recognized a \$13.7 million reduction in F-16 costs with life-cycle cost savings that will exceed \$30 million as a result of six Value Engineering Change Proposals (VECP) submitted in 1983.

A letter from Deputy Secretary of Defense William H. Taft IV, which was read at the ceremony, commended Fort Worth's industrywide promotion of Value Engineering through sponsoring and participating in Fort Worth and Air Force seminars on the VECP program last year.

This marked the second consecutive year that Fort Worth received a Value Engineering Award. Last year, the Air Force presented the division with the 1982 Contractor Value Engineering Achievement Award in recognition of \$24 million in savings in the F-16 program.

## Convair Will Build Huge Magnet For DoE Fusion Energy Research

Convair has received a \$16 million contract from TRW to design and manufacture a huge superconducting magnet to be used by the Department of Energy in fusion energy research.

The magnet, a follow-on to an earlier Prototype Magnet System delivered in 1981, will weigh 210 tons, nearly five times as much as the earlier magnet. The first magnet built for TRW has been operating continuously since 1981.

The new magnet is scheduled to be delivered to the Department of Energy in February 1987.

The new magnet will be approximately 30 feet long, 15 feet high and 11 feet wide. The magnetic field will be generated by currents flowing through 38 miles of niobium titanium superconductor wound on a four-inch-thick stainless steel bobbin. In use, the windings will be cooled by liquid helium to a temperature of minus 451 degrees Fahrenheit. Additional cooling will be provided by liquid nitrogen within the magnet's vacuum vessel.

## H. G. Rickover Ends Initial Sea Trials

The Hyman G. Rickover (SSN 709), the nation's latest fast-attack, nuclear-powered submarine, returned to Electric Boat May 17th after completing successful initial sea trials.

The sea trials were performed under the direction of Adm. Kinnaird R. McKee, Director of the Naval Nuclear Propulsion Program, and the ship was commanded by Capt. Fredrik H. M. Spruitenburg of York, Pa.

The Hyman G. Rickover is scheduled for delivery to the Navy in June.

Convair is the nation's leading producer of superconducting magnets. In addition to the PMS series of magnets, Convair has built a 47-ton magnet for the Oak Ridge National Laboratory large coil program and three development magnets for the Elmo Bumpy Torus program, also at Oak Ridge.

Twelve large superconducting solenoids also have been delivered to the Lawrence Livermore National Laboratory for the Mirror Fusion Test Facility, and eight additional transition and axicell coils will be delivered to the facility by mid-1985.

## R. W. Kiger Named To Personnel Post At Headquarters

Ralph W. Kiger has been appointed Corporate Director-Personnel Planning and Placement, with responsibility for directing the company's Employment, Engineering Personnel Services and College Relations programs.

He joined General Dynamics at Convair in 1967 as a design engineer and was promoted to Program Manager, Lead Engineer and Manager of Management Personnel Relations, his most recent position.

Kiger received a Bachelor of Science degree in Aeronautics and Astronautics from the University of Washington in 1967 and a Master of Science degree in Aerospace Engineering from California State University in San Diego in 1973.



Kiger



**On a Roll.** Bill Schweitzer, an Experimental Fabrication Department employee at the Land Systems Center Line plant, adjusts a device he developed for the efficient and safe movement of tank tracks. The device, which was custom-fitted to a forklift truck, rolls and unrolls a 4,500-pound M1 track in a few minutes and holds it securely during movement to or from a tank. Schweitzer drew his own sketches for the design and built the device in Center Line's Prototype Shop. Land Systems is checking into a patent for the device and possible use divisionwide.

### Savings and Stock Investment Values

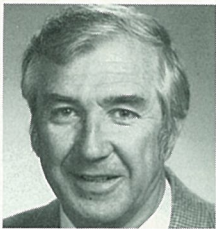
Salaried	April 1982	April 1983	April 1984
Government Bonds	\$ 2.8632	\$ 3.4401	\$ 3.7145
Diversified Portfolio	1.9218	2.9224	2.9229
Fixed Income	1.3183	1.4725	1.6520
Hourly			
Government Bonds	2.8598	3.4375	3.7129
Diversified Portfolio	1.9617	2.9843	2.9763
GD Stock	\$24.1250	\$43.2500	\$45.6250



## T. Lewis Will Direct Preliminary Design Section at Pomona

Thomas V. Lewis has been named Director of Preliminary Design and Advanced Projects at Pomona.

In his new position, Lewis, who formerly was Director, Advanced Fire Control, will be responsible for the direction of the Preliminary Design Section, including technical interface with the military in new business activities.



Lewis

Lewis began his career with General Dynamics as a design engineer in 1960. Since then he has held a variety of engineering and management assignments, many of which involved work on advanced gun concepts.

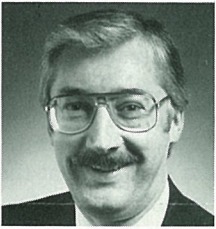
He received a Bachelor of Science degree in Mechanical Engineering from California State College, Los Angeles, in 1960 and a Master of Science degree in Engineering Management from the University of California at Los Angeles in 1972.

## Richard C. Alexander Joins Camden Facility As New IR Director

Richard C. Alexander has been named Director of Industrial Relations at Pomona's Camden Facility with responsibility for employee services, employee relations and security and safety.

Prior to joining Pomona, Alexander was Manager of Industrial Relations for the John Deere Farm Equipment Corporation, Waterloo, Iowa, and also worked for Chrysler Corporation in Michigan.

Alexander earned a Bachelor of Business Administration degree from the University of Detroit and a Master of Arts degree in Professional Management from Indiana Northern University, Fort Wayne.



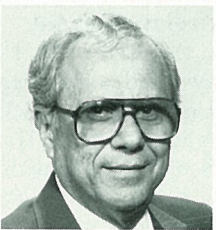
Alexander

## R. Molina Appointed Convair's Quality Assurance Director

Rudy N. Molina has joined General Dynamics as Director of Quality Assurance at Convair.

In his new position, Molina is responsible for integrating Convair's Quality Assurance programs from original design through quality audit and inspection, as well as subcontractor inspection and audit and corrective action on deficiencies.

Molina comes to Convair after more than 34 years of service with the U.S. Government. Most recently he was Director of Quality Assurance with the Defense Logistics Agency in Los Angeles. Prior to that assignment, he held a series of U.S. Government Quality Assurance posts, assigned to aerospace contractors in the Los Angeles area.

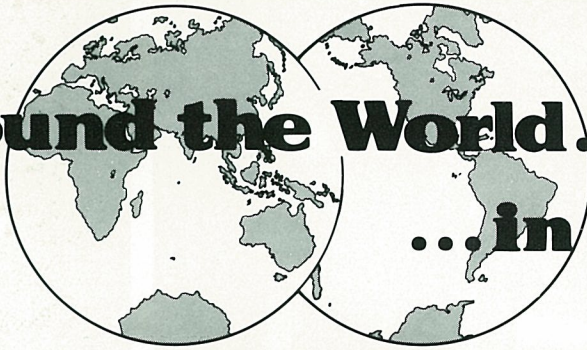


Molina

## J. Sherley Honored

Joan Sherley, NASA Missions Manager in Convair's Shuttle/Centaur Program Office, has been named one of San Diego's outstanding women in management, executive or professional roles by the San Diego YWCA. Sherley has worked in Convair's space programs for 29 years, beginning as an engineer on Atlas and Centaur programs.

## Around the World... ..in GD



**CHQ:** John R. Chambers joined as Associate Auditor . . . Cecil L. Husbands Jr. as EDP Auditor . . . Philip C. Chadwick as Auditor . . . Debra A. Neff as Senior Staff Accountant . . . John E. Ward transferred from Electronics and was promoted to Corporate Manager-Product Assessment.

**Fort Worth:** Delbert E. Briley Jr. was promoted to Tooling Supervisor . . . Herbert Campbell II to Logistics Group Engineer . . . Max L. Culver to International Co-production Manager . . . Jean S. Dantas and Dan W. Hawkins to Senior Program Analyst . . . Marc B. Deahl to Subcontract Management Coordinator . . . Alfred G. Drysdale and Joe C. Porterfield to Engineering Administrative Group Supervisor . . . Jose A. Jimenez and Ray D. Leach to Senior Logistics Engineer . . . Terry C. Lawson, Kenneth L. Miller and John L. Tezak Jr. to Logistics Chief . . . Peter R. MacLean to Senior Engineering Planner . . . Gaye D. Maitland to Senior Manufacturing Support Equipment Engineer . . . David E. Mays to Engineer . . . Neal N. McCollom to Manufacturing Technology Supervisor . . . Johnny W. Roberts to Manufacturing Control Supervisor . . . Charles E. Siefert to Material Supervisor . . . Mark W. Smith to Quality Assurance Field Engineer . . . Wesley E. Spreen to European Program Office Material Manager . . . Guy H. Tyra to Logistics Manager . . . Henry R. Vinz to Principle Field Service Engineer . . . Charles H. Waters Jr. to Tool Manufacturing General Foreman . . . Richard H. Weathersby to Procurement Chief . . . David T. Weber to Administrative Services Chief.

**Electronics:** Teresa L. White was promoted to Manager of Finance . . . Russ J. Gilbert to Operations Senior Project Manager . . . James L. O'Brien and Frank E. Sablan to Materiel Operations Section Head . . . William J. Reddick and Eugene V. Rinehart to Operations Section Head.

**Convair:** Jay B. Adler, Arlan D. Barber, Frank B. Coria and Thomas Dangelo Jr. were promoted to Group Engineer . . . John A. Fielder to Operations General Supervisor-Plant Services . . . Charlie J. Johnson to Operations Supervisor-Plant Services . . . George K. Heim to Operations Supervisor-Manufacturing . . . Richard H. Hennum to Quality Assurance Supervisor . . . Frank Hinton Jr. to Quality Control Chief . . . Edward C. Harbett Jr. and Dennis Uhlken to Engineering Chief . . . Mary R. Hardy to Travel Services Supervisor.

**Pomona:** Marion J. Coffield was promoted to Project Coordinator . . . Michael J. Danko and J. Reid Slaughter to Project Engineer . . . Nancy E. DuBois to Professional Staffing Supervisor . . . Richard D. Garwacki, John E. Kurtyka and Anton S. McLane to Senior Quality Assurance Specialist . . . John M. Cuthbertson, Thomas LaBudda, Rebecca R. Rhoads, and James A. Szyerwalt to Group Engineer . . . Norma J. Roman and Richard C. Sweet to Project Representative . . . Gary E. Thompson to Plant Engineering Supervisor . . . Dennis L. Vanzant to Production Control Supervisor . . . Lawrence E. Virgoe to Staff Engineer . . . Stanley D. Yearly to Manufacturing & Material Control Manager . . . Robert A. Bradley and Charles R. Womack to Project Administrator . . . Frank J. Cuccio and Michael E. Moody to Publications Group Supervisor . . . Norris A. Felt to Senior Test Engineer . . . Raymond K. Fukuchi to Estimating Specialist . . . Gordon P. Vaughan to Senior Facilities Specialist . . . Harold E. Wolfe to Engineering Group Supervisor. At Camden, Cynthia D. Skidmore to Systems Analyst . . . Jack D. Estes to Material Production Control Chief . . . Steven R. Robinson to Material Requirements Supervisor . . . Michael E. Rhodes to Manufacturing General Supervisor . . . and Chester Downey III to Senior Manufacturing Test Engineer.

**Data Systems:** At Western Center, Lisa E. Bryan, Glenn A. Clawson, Leroy Anderson, William Brown, Anita Brubaker, Behzad Goudarzian, Sergio A. Martinez, Gregory Mink, Robert Schultz, Valerie Wisch, Carol A. McClanahan and Jay B. Wood were promoted to Software Engineer . . . Paula M. Brown, Marian M. Dieter, Jennifer L. Epler, Mary B. Gantner, Susan M. Halkland, James Kurtenback, David A. Pitts, Susan L. Yacuzzo, Teresa A. Reeves, Guy G. Stevens, Melinda K. Stoddard, Michael Camacho, Richard Delameter, Sally More, Amy Peltekian, Terri T. Yenzer and Eric V. Stromberg to Programmer/Analyst . . . Ernesto Salinas and Jerome D. Sabuda to Engineering Software Supervisor . . . Michael S. Ayres to Engineering Documentation Specialist. At Central Center, Michelle R. Anderson, Lori D. Faris, Douglas A. Welker, Nicholas J. Summerville and Lawrence J. West were promoted to Software Engineer . . . Sarah L. Cooper to Industrial Relations Analyst . . . Michael W. Kaker, Christina L. Bolton, Mary J. Boraiko, Cindy S. Card, T. Kim Dao, Mary Ellen Scott and Susan S. Thrums to Programmer/Analyst . . . Roberta H. Bose to Senior Programmer/Analyst . . . Laura A. Lane to Administrative/Financial Analyst . . . D. G. Chamberlain to Computer Related Training Manager . . . William R. Haughey to Engineering Software Chief . . . Jerry D. Alderson Jr., Craig G. Anderson, Paul J. Boatman, Robert L. Evans, Calvin A. Head, William H. Hord III, Gary W. Keith, Jack D. Reigh and Ross W. Wheelwright to Engineering Software Supervisor . . . Larry V. Tucker to Software Engineering Specialist . . . Marvin G. Junge to Product Control Specialist. At Eastern Center, Cynthia M. Babbitt was promoted to Senior Buyer . . . David C. Balletto, George A. D'Auteuil Jr., James L. Douglas, Nancy M. Dupre, Joan K. Fetter, Raymond C. Gandy III, Jose A. Hamameh, Kenneth S. Johnson, Linda M. Johnson, Earnest W. Kinsler, Nicholas G. Lombardi and Jeffrey M. Sakowski to Programmer/Analyst . . . Richard M. O'Connor and Frank A. Szalkowski to Business Systems Development Supervisor . . . Robert W. Bradley to Senior Software Engineer . . . Anthony M. Klick to Engineering Software Engineer . . . Gary M. Miskiewicz to Senior Product Control Analyst . . . Robert L. Tarnow to Computer Systems Specialist.

**Datagraphix:** Claire M. Boyles and Sheila Hammond were promoted to Accounting Supervisor . . . Barry R. Betts to Marketing Software Support Manager . . . Susan V. Gregory to Products Planning Manager . . . Paul R. Saunders to Lease Accounting Manager . . . Robin L. Platt to Boston District Service Manager.

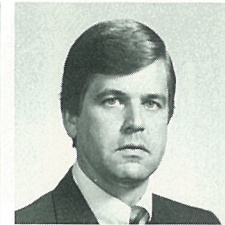
**GDSC:** Alvin E. Brown transferred from Corporate and was promoted to Contracts Manager . . . Martin A. Olson transferred from Corporate and was promoted to Manager-Proposal Development . . . Robert V. Spino transferred from Corporate and was promoted to Senior Financial Analyst.

## J. Sucov, B. Beaver Appointed to Convair Marketing Posts

Two marketing promotions have been announced at Convair: Joel Sucov has been named Director of Advanced Missile Systems Marketing, and Bradley Beaver has been named Director of Tomahawk Programs Marketing.



Sucov



Beaver

Sucov joined Convair in 1977 as a Project Engineer and assumed marketing responsibilities in 1981. He holds a Bachelor of Science degree in Aeronautical Engineering from New York University.

Beaver has been with Convair since 1978, serving initially as an engineering specialist in Tomahawk logistics. He was promoted to Manager of International Marketing in 1979. He holds a Bachelor of Science degree in Engineering from the U.S. Naval Academy and a Master of Business Administration degree in Marketing from the University of Nebraska.

## Jack Wolff Appointed To New Tomahawk Position at Convair

Jack L. Wolff has been appointed Director - All-Up-Round System Engineering and Integration Agent for Convair. He was previously Program Director for the Medium Range Air-to-Surface Missile Program.

In his new position, Wolff will direct the program under which Convair is solely responsible for both design and performance baselines for the Tomahawk cruise missile. He will also oversee and approve the efforts of all subcontractors and associate contractors for the various versions of the missile.

Wolff joined Convair in October 1980 after his retirement from the U.S. Air Force. He holds a Bachelor of Science degree in Mechanical Engineering from Oklahoma State University and a Master of Science degree in System Engineering from the Air Force Institute of Technology.

## Wise Receives Top Energy Award

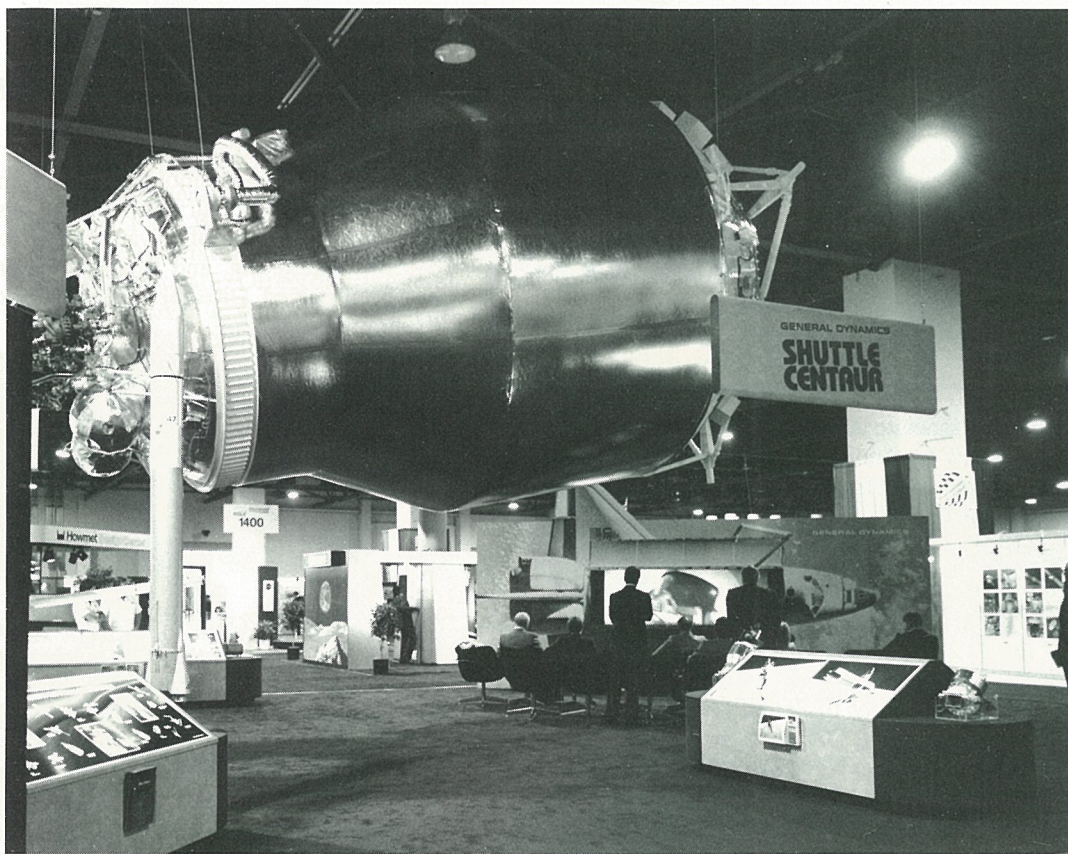
John Wise, Design and Construction Engineer in Facility Management and Plant Engineering at Pomona, was recently named "Energy Engineer of the Year" by the Association of Energy Engineers. A plaque was presented to Wise in recognition of his efforts to reduce energy usage and lower utility costs for the division.

Projects which Wise instituted resulted in modernization and more efficient usage of chilled water for air conditioning and machinery cooling and saved Pomona \$265,000 in energy costs in 1983.

## GD World

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Stout, Z. Joe Thornton, Don  
Zlotnik





**Products on Display.** A number of General Dynamics divisions were represented in the company's display at the Annual Meeting and International Aerospace Exhibit held by the American Institute of Aeronautics and Astronautics in Washington, D.C., May 1st-3rd. The General Dynamics display drew many interested viewers from government and industry, who were given details of the various products by company officials. In the photo at right, Congressman Bill Lowery of

California, a member of the House Committee on Science and Technology (at left), inspects a model of the Phalanx close-in shipboard weapon system with John De Blanc, Convair's Director of Program Development Services (center), and William H. L. Mullins, Staff Vice President in the company's Washington, D.C., office. David S. Lewis, Chairman and Chief Executive Officer, was General Chairman for the AIAA meeting and spoke at the opening session.

## Annual Meeting

# GD Continuing Good Pace in Sales and Earnings

*Continued from Page 1*

companies, won a contract to design the Midgetman's mobile launcher system. Land Systems is providing strong support to Convair in this work.

- Convair, last month, won one of two Air Force contracts for demonstration work on a very advanced guidance system for cruise missiles of the 1990s and beyond. The division also has research work under way on a variety of manned space station subsystems and transportation concepts. It also is intensifying its efforts to determine the viability of the Atlas and Centaur space vehicles being sold on a commercial basis to launch communication satellites and other high-priority payloads.

- Pomona is maintaining its leadership position in guidance technologies that are the foundation of its line of tactical missile and gun systems. Programs now transitioning from research and development into initial production include the RAM ship-defense system and the Stinger-POST, an even more advanced version of the highly effective Stinger anti-aircraft weapon.

- Land Systems is concentrating its R&D work on meeting U.S. Army requirements 10 years out, including features

that would be required on the next generation main battle tanks and other types of military vehicles that may be needed in the future.

- Fort Worth is working hard on the evolutionary development of new versions of the very successful F-16. The F-16C with its advanced operational systems continues on schedule. Of great consequence was the decision made by the U.S. Air Force to put the company-funded F-16XL, now called the F-16F, into development. Plans have been established for the future production of this radically new fighter-bomber concept. "This is an excellent example of where a division identified an opportunity for potential new business and the Board of Directors fully supported the program from start to finish with heavy use of company funds," Lewis said.

- Electric Boat has been awarded contracts, as has the Newport News Shipbuilding company, to work on the design of the U.S. Navy's planned new attack submarine which is expected to succeed the SSN 688-class beginning in the mid-1990s. This preliminary design work will lead to an intense competition, the winner of which will be selected as the Navy's design agent for this very advanced weapon system.

Lewis said the company intends to continue heavy research and development and facility modernization programs in the years ahead.

"In 1984, we expect to spend approximately \$300 million for new laboratory and manufacturing equipment and for badly needed engineering and administrative office buildings," Lewis said. "This investment compares with an average annual capital expenditure rate of about \$175 million over the past five years."

"In all of our divisions," Lewis said, "we have been able to generate contracts for studies and design work, from those concerned with the most embryonic concepts to those ready for preproduction or full-scale production in the immediate years ahead."

Lewis added that the pattern of success in obtaining those basic research programs gives General Dynamics a chance to continue its growth in a number of high technology areas, not necessarily concerned only with defense programs.

"While there is a probability that there will be a tightening of the defense budget in this country in the next few years," Lewis said, "we believe that our high pri-

ority major programs will continue at healthy levels."

Lewis said the company's commercial businesses are seeing the markets in their areas gradually improving. Datagraphix, which has introduced new computer output microfilm products, was profitable in the first quarter of 1984, and, while the markets for coal and aggregates continue to be slow in recovering from the recession, the Resources Group showed improvement in the first quarter compared to the same period in 1983.

Of great importance, Lewis said, has been the significant increase in corporate cash flow. "We have cash in the bank, we have paid for our capital assets and for our R&D programs, we have spent \$420 million to purchase more than 8 million shares of company stock to use for corporate purposes and we expect to be able to finance our expanded funding programs without resorting to any outside borrowing," he added.

Lewis said that General Dynamics is in fine shape and will have many opportunities for growth and expansion in the years ahead, but each of those opportunities will be highly competitive.

"To win," he said, "we must be prepared with an efficient and productive work force, with excellent laboratory and manufacturing facilities and with many creative new ideas. We intend to be ready."

## Contracts Received For \$9 Million for F-16C/D Systems

Fort Worth has received two contracts totaling \$9 million to begin development of systems scheduled for future installation in F-16C and F-16D aircraft.

The U.S. Air Force awarded the division a \$7.1 million contract for the initial phase of development of a quadredundant, digital flight control system for C and D model Falcons. The other contract, for \$1.9 million, is for initial hardware development of a crash-survivable flight data recorder that is intended to become standard government-furnished equipment for Air Force, Army and Navy aircraft.

Other phases of the effort, to be covered by separate contracts, will provide for 12 months of simulation and ground testing and three months of flight testing. The flight test phase, which will involve two modified F-16s, is planned to begin in 1986.

## Sixth Trident Is Christened

*Continued from Page 1*

would like to extend a special welcome to them and their families."

Tovar introduced David S. Lewis, Chairman and Chief Executive Officer of General Dynamics, who in turn introduced Dickinson.

"All of us can take pride," Lewis said, "in the fact that the Tridents are doing a splendid job in the service of the United States Navy."

Electric Boat has already delivered four of the 560-foot, 18,750-ton ships — USS *Ohio* (SSBN 726), USS *Michigan* (SSBN 727), USS *Florida* (SSBN 728) and USS *Georgia* (SSBN 729). In addition to the *Alabama*, the division has a backlog of six more Tridents.

## New General Counsel Named

*Continued from Page 1*

as a member of the company's legal staff.

He was associated with the Wabash Railroad as an attorney from 1958 to 1964 and as a general attorney in 1964-1965 with the Norfolk and Western Railway Company, into which the Wabash Railroad was merged.

A native of St. Louis, Duesenberg was awarded a law degree from Valparaiso University Law School in 1953 and was graduated from Harvard University Law School in 1956 with a master's degree.

From 1953 to 1955, he served with the U.S. Army assigned to the Judge Advocate office in Heidelberg, West Germany.

Lynn, 66, a native of Coldwater, Kan., joined General Dynamics in June 1971 and was elected to the company's Board of Directors in April 1976. A 1942 graduate of the University of Illinois, he received his law degree from the same university in 1947 and practiced for 10 years with the predecessor of the Chicago law firm of Jenner & Block.

In 1957, he was named Vice President of Fairbanks, Morse & Co., Chicago, and four years later joined the Youngstown Sheet and Tube Co., as Assistant General Counsel.

He subsequently became General Counsel, Secretary and a Director of Youngstown Sheet and Tube and, in 1969, when Lykes Corporation and Youngstown Sheet merged to form Lykes-Youngstown Corporation, he became a Director, member of the Executive Committee, Vice President and Chief Legal Officer of the new company.

## Convair Mirrors In Space Tests

April's Space Shuttle mission placed in orbit NASA's Long-Duration Exposure Facility (LDEF), a platform designed to carry a number of individual experiments that will test the effects of outer space for nearly a year before its recovery in February 1985.

One of the 57 experiments on the LDEF is verifying technology for Convair's Survivable Large Aperture Trough System (SLATS) concentrator, a device that converts sunlight into electricity using a series of curved mirrors and solar cells.

Twenty mirror samples, made from a variety of materials such as titanium, copper, aluminum, steel and graphite composite, are being tested for the effects of atomic oxygen, micrometeorites, unfiltered sunlight and other environmental factors in space. A number of different coatings have been applied to the surfaces of the mirrors to determine the best combination for use in space. SLATS is a Convair program to make spacecraft solar cell arrays more efficient and less costly than conventional arrays.



## Barlow to Head Electronics Div.; Hall Is New GM at Data Systems

Melville R. Barlow and Asaph H. Hall have been named to new positions within the company.

Barlow, 54, formerly Vice President and General Manager of the Data Systems Division, has been appointed Corporate Vice President and General Manager of the Electronics Division. Hall, 50, who has served as Staff Vice President-Corporate Planning since 1978, will succeed Barlow as Vice President and General Manager of Data Systems.



Melville R. Barlow



Asaph H. Hall

Barlow joined General Dynamics in 1955 as a flight test engineer at Convair. After a number of increasingly responsible project engineering and program management positions at that division, in 1972 he joined Pomona as Program Director for the Standard Missile-I.

In 1975, he was named Corporate Director of the Data Systems Services organization and was appointed Vice President and General Manager of the Data Systems Division when that unit was formed in 1981.

A native of New Britain, Conn., he was graduated from Michigan State University in 1951 with a Bachelor of Science degree in Mechanical Engineering. From 1951 to 1955, he served in the U.S. Air Force.

Hall joined General Dynamics as Corporate Director of Planning in January 1977 after a 19-year career in industry and government. In 1958, he joined Westinghouse Electric Corporation as an applications engineer and later worked at that company's Defense and Space Center as Manager of Market Analysis and later as Requirements Manager.

In 1969, he joined the U.S. Department of Transportation, and after serving in a number of positions of increasing responsibility, including Special Assistant to the Secretary of Transportation, was named Federal Railroad Administrator in 1975.

A native of Elmira, N.Y., Hall was graduated summa cum laude from Dartmouth College in 1955 with a bachelor's degree, and later a master's degree, in engineering and business administration. He served in the U.S. Army from 1956 to 1958.

## Atlas Booster Puts NAVSTAR Into Earth Orbit

A General Dynamics Atlas booster successfully launched a NAVSTAR satellite for the Global Positioning System into orbit on June 13th.

Atlas booster 42E rocketed into the sky from Vandenberg AFB, Calif., sending the ninth in a series of military navigation satellites into an elliptical orbit. The NAVSTAR orbit will later be circularized at its high point, more than 12,000 miles above the Earth.

The NAVSTAR satellites for the Global Positioning System are used to provide precise position and navigational information to U.S. ships, aircraft, ground vehicles and troops. Users acquire highly accurate three-dimensional position and velocity information and a precise timing reference in real time through the Global Positioning System's network of NAVSTAR satellites.

The Atlas E boosters were operational weapon systems deactivated some years ago and stored at Norton AFB, Calif. The launch vehicles are removed from storage, as needed, and refurbished by a Convair team at Vandenberg AFB.

# GD World

Vol. 14 No. 6

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June 1984

## Phalanx Gun System Installed On the 100th U.S. Navy Ship

The U.S. Navy now has 100 ships armed with the Pomona-built Phalanx Close-In Weapon System.

A ceremony commemorating the installation of Phalanx on the 100th U.S. ship was included in the June 8th delivery of the USS *Rentz* (FFG-46) at San Pedro, Calif.

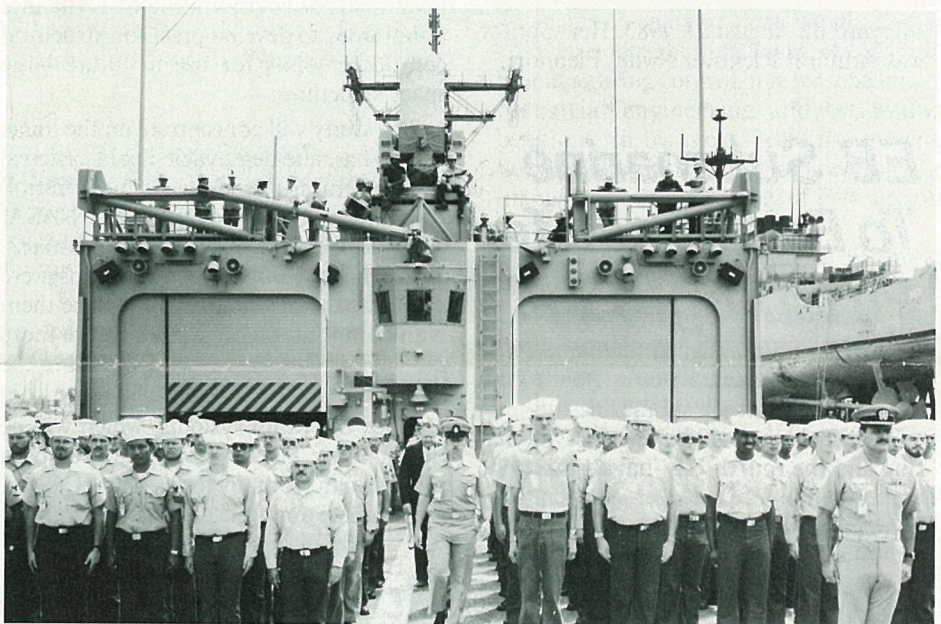
Delivery of the guided missile frigate was accepted by Capt. David Kalb, Supervisor of Ship Building, Conversion and Repair, who immediately turned command of the ship over to Cmdr. Martin Mayer. Officers and crew were gathered on the ship during the event at the Todd Pacific Shipyards.

Norman C. Stranberg, Pomona Vice President and Phalanx Program Director, told the crew and guests that "We are very proud that Phalanx has a role not only in the *Rentz's* surface warfare capability, but also in the 99 ships which previously received Phalanx, and in those yet to come.

"General Dynamics recognizes the need for, and the unique importance of, Phalanx to our fleet's self-defense. Likewise,

we recognize the importance of our Standard Missile area defense system, which is also carried on the *Rentz*."

The USS *Rentz's* mission is to provide anti-air, antisubmarine, and antisurface protection for military and merchant shipping, amphibious task forces, under-way logistics groups and carrier battle groups. She was named in honor of Cmdr. George S. Rentz, the only Navy chaplain to receive the Navy Cross during World War II. She carries 15 officers, 16 petty officers and 171 enlisted men.



**Phalanx Ceremony.** When the USS *Rentz* was delivered to the Navy on June 8th, she was the 100th U.S. ship to be armed with the Phalanx Close-in Weapon System. In top photo, Norman C. Stranberg, Pomona Vice President and Phalanx Program Director, presents a plaque commemorating the event to the ship's skipper, Cmdr. Martin Mayer. In lower photo, the crew stands at attention during the ceremony. The ship's Phalanx is seen in the background.

## Pomona Plant in Arizona Is a General Dynamics-Navajo Partnership

By Jerry Littman

One of General Dynamics' smaller facilities is Pomona's Navajo electronic sub-assembly plant at Window Rock, Ariz. —the only GD operation on an Indian reservation.

Since it was established 16 years ago, the Navajo facility has proved to be an important operation for the company as well as a source of continuing employment for the Indians living on the tribal land.

Working together since 1967, Pomona and the Navajo Tribal Council have built a successful partnership based on an understanding of common needs and goals.

In recent testimony before the Presidential Commission on Indian Reservation Economies, this partnership between Pomona and the tribal leadership was described as "mutually beneficial" by William H. Govette. As Pomona's Vice President of Fabrication and Assembly,

Govette has responsibility for the operation of the Navajo plant.

General Dynamics has succeeded in the Navajo operation, Govette said, "because we made a serious commitment to locate and stay on the reservation. We have not been casual in our approach. As part of our partnership, we assimilated Navajos into leadership positions within the plant as quickly as possible."

Govette added, "Our success demonstrates that a competent management team — sensitive to cultural and traditional considerations — can work effectively with Indian tribes to achieve mutually beneficial results. We have had good faith and integrity in all our dealings with both the Navajo Nation and our employees."

Continued on Page 2



subassemblies for Standard Missile and Phalanx. Employees in the photo at right perform final assembly on circuit cards for Standard Missile in the plant at Window Rock, Ariz. The plant has been operating for 16 years.

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**Production Partners.** Although small by comparison with other General Dynamics plants, Pomona's Navajo Facility has proved to be a successful partnership for the company and the Navajo Tribe. Approximately 250 employees are engaged in



## H. G. Rickover Delivery Is Set For Late June

The *Hyman G. Rickover* has been scheduled for delivery to the Navy late this month after completing "very successful" initial sea trials.

The 688-class, fast-attack submarine bearing the name of "the father of the nuclear Navy" has been scheduled to be commissioned in July.

The *Rickover* (SSN 709) recently put in the shortest first (Alpha) sea trial of any ship in her class built by Electric Boat. The trial lasted about 24 hours.

The trials were performed under the direction of Admiral Kinnaird R. McKee, Director of the Naval Nuclear Propulsion Program. The ship was commanded during the trial by Captain Fredrik H. M. Spruitenburg.

"The trials were very, very successful," reported Chuck Chorlton, Manager of Test and Docks at Electric Boat. "Everything worked exceptionally well, and the ship had the fastest turnaround time on an initial sea trial that we have had yet."

Aboard for the trial was a 34-person Electric Boat test crew plus a Navy crew contingent. The senior EB official aboard was Fritz Tovar, Electric Boat Vice President and General Manager.

The *Rickover* is the 17th ship of her class to be built by Electric Boat. She was launched at Electric Boat's Groton, Conn., shipyard on August 27, 1983. Her sponsor was Admiral Rickover's wife, Eleonore.

\* \* \*

## EB Submarine To Be Named for Pittsburgh, Pa.

The Navy has assigned the name *Pittsburgh* to SSN 720, Electric Boat's 20th 688-class, fast-attack submarine.

The new boat will be the first submarine and the fourth U.S. naval ship to be named in honor of the steel-producing city in Pennsylvania. The first *Pittsburgh*, a 175-foot sidewheel ironclad gunboat, served from 1862 to 1865 and saw action in the Civil War.

The second ship to carry the name, a 504-foot armored cruiser (CA 4), was in the fleet from 1905 to 1931 and participated in World War I.

The third *Pittsburgh*, a 675-foot heavy cruiser (CA 72), served from 1944 to 1970 and earned two battle stars for her service in World War II in the Pacific theater.

The new *Pittsburgh* is scheduled to be launched later this year. The 360-foot, 6,900-ton submarine is one of 10 now being built by Electric Boat. The division so far has delivered 16 of the ships.

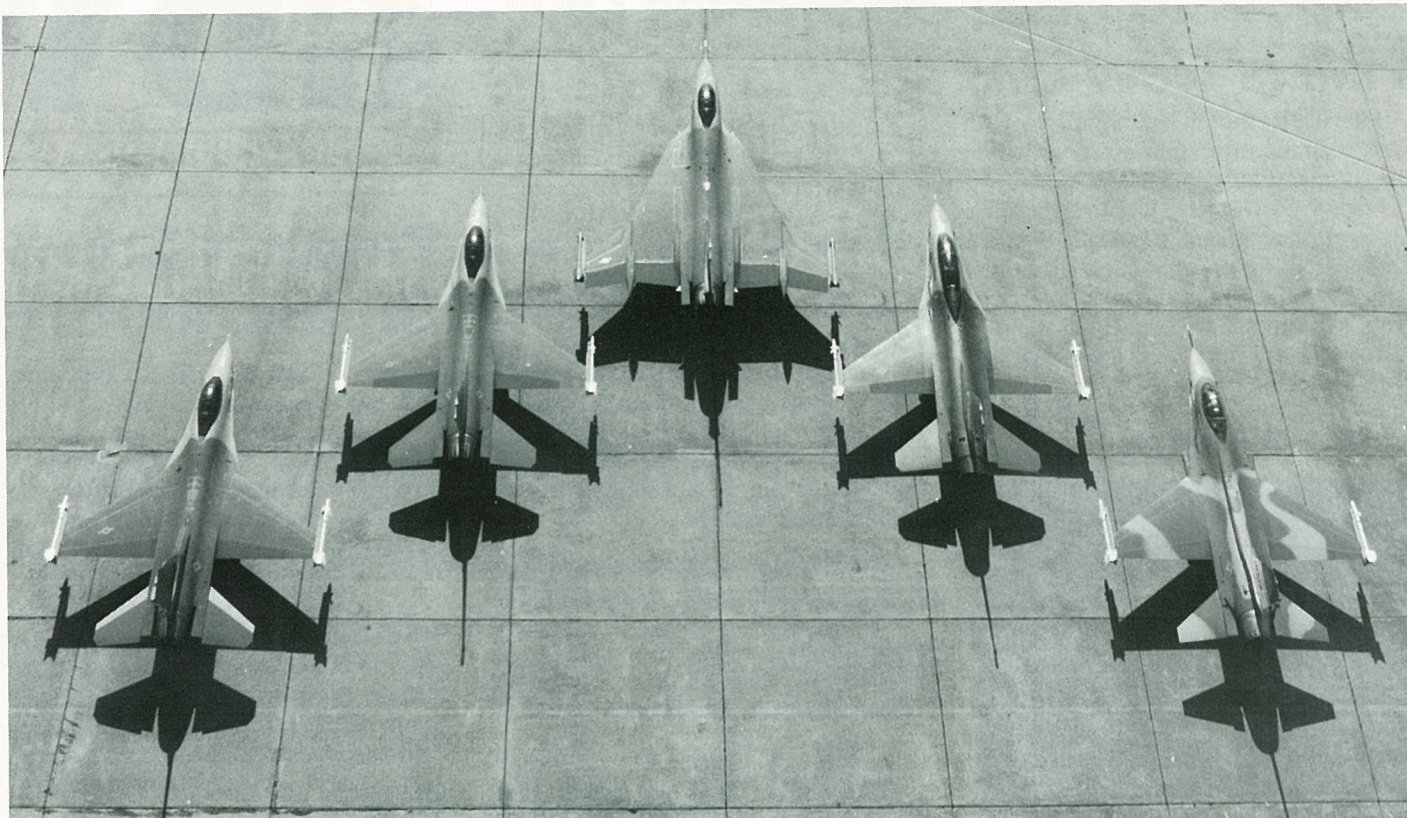
## USAF Awards CMAG Contract

Convair has been awarded an \$18.9 million Air Force contract for research and development of a Cruise Missile Advanced Guidance (CMAG) system.

During the 42-month advanced guidance technology development program for the Aeronautical Systems Division, Convair will design, fabricate and flight-test a guidance system using laser radar and autonomous guidance processors.

"This is a significant contract for Convair and is the direct result of more than four years of development effort," said Brad Sowers, CMAG Program Manager. "This new guidance capability will greatly expand the missions and effectiveness of our cruise missile product lines for the future."

According to Sowers, Convair will develop the laser radar, guidance processors and software that are expected to provide a new capability for navigation update, terrain-following, obstacle avoidance, precision terminal homing and target classification.



**Ground Formation.** A rare opportunity to get five different F-16 versions in one photo occurred recently when they were displayed on the flight line at Fort Worth. From left to right are the F-16C, F-16A, F-16F, F-16/79 and AFTI/F-16.

## Convair Will Develop Composite Joints for Large Space Structures

Convair has been awarded a \$490,000 contract by the U.S. Air Force's Aeronautical Systems Division's Flight Dynamics Laboratory to develop precision structural composite joints for use in future large space structures.

The study will concentrate on the joints of two baseline deployable beam systems, the Structural Assembly Demonstration Experiment (SADE) developed by NASA, and the Convair-developed GEO-truss. The original joints in both systems were of metal; the new joints will replace them with composite materials which are more dimensionally stable when exposed to the temperature extremes of outer space.

Since the beam systems, which will be the building blocks of any future space system, may contain thousands of joints, even minute amounts of clearance in them will result in unacceptable amounts of

free play when joined in structures hundreds of feet long.

The three-year program outlined in the Air Force contract will involve design, analysis, fabrication and testing of prototype joints made of both resin matrix and metal matrix composites.

Convair has extensive experience in manufacturing space-related composite components. An earlier Convair program reduced the weight of the Space Shuttle midfuselage section by nearly 1,300 pounds by use of boron/aluminum composite struts. Convair also designed and built the 20-foot-long graphite/epoxy booms for the Shuttle's Remote Manipulator System.

Other Convair composite hardware was included in NASA's HEAO-B spacecraft, the LANDSAT-D satellite and the NASA magnetic survey satellite.

## Subassembly Facility Is a GD-Navajo Partnership

*Continued from Page 1*

The General Dynamics-Navajo association is the result of fortunate timing. In 1967, the Bureau of Indian Affairs was encouraging industry to locate on Indian lands, and Pomona at that time needed to expand its electronic assembly capability.

Discussions were held between representatives of the division, the Bureau of Indian Affairs and the Navajo Tribal Council, and the talks resulted in the tribe constructing a plant which was leased to General Dynamics.

Today, 250 Navajo employees are assembling circuit cards for Standard Missile and Phalanx and round wire harnesses for Standard Missile cables, and the opportunity exists for Navajo employees to advance on the job. The plant opened with a management team of 26 non-Indians.



**Conference.** John R. Hunt, at left, Superintendent of Phalanx and one of the Navajo Indians who have risen to management posts at the facility, discusses a production matter with Harri-son Pierce, Facilities Support Manager.

Today, out of 22 employees on the management staff, 14 are Indians.

Plant Manager Mike Enfield's immediate staff includes three Navajos: Dennis Hardy, Superintendent of Standard Missile, who began working at the Navajo facility 16 years ago; John R. Hunt, Superintendent of Phalanx, who rejoined the division earlier this year after previously working at Navajo, and Edna Yazzie, who joined the facility about 15 years ago and is now in charge of Quality Assurance.

Navajo facility employees describe their work as a continuing challenge. Mattie Singer, a production supervisor for Standard Missile, said the challenge exists in the need to learn to operate new equipment. "I like it when there is a lot of challenge," she said. "In the 16 years I've worked at General Dynamics, I've enjoyed every minute. There are so many things I have benefited from here."

Hunt said there is a challenge in training workers to keep up with new technology. "We've just finished the final transition of Phalanx subassemblies to Navajo," he said. "We are now involved in assembly work all the way from insertion of electronic components into circuit cards to final assembly."

Growth has continued over the years, in both the number of employees and in production, and planning is under way with the Navajo Tribal Council to build a 15,000-square-foot addition to the existing 28,255-square-foot facility.

The growth in employees and floor space reflects the increased production and production support work on the Standard Missile and Phalanx lines.

According to Enfield, "One thing the expansion will do is move the harness

## Electronics Div. Delivers F-4 Test Station

A special avionics test station to support the F-4 fighter has been delivered by the Electronics Division to the Sacramento (Calif.) Air Logistics Center.

The test station, a modification of the company's Processors-Pneumatics Station for the F-16C/D Avionics Intermediate Shop, will be used by the Air Force to test the central air data computer and the altitude encoder unit of the F-4. The central air data computer provides corrected inputs to the aircraft's dynamic cockpit instruments, such as the altimeter, airspeed indicator and the angle-of-attack indicator.

Built under contract to the Air Force's San Antonio (Tex.) Air Logistics Center, the station was delivered two months ahead of contract schedule.

work out of trailers, where they had to go to make room for the Phalanx program."

In addition to serving as a major employer on the reservation, General Dynamics supports the Navajo community in other ways. Recently, the corporation contributed to the capital campaign for a Navajo Educational Center that will bring together the groups which administer schools on tribal lands, including the State of Arizona, the Bureau of Indian Affairs, religious groups and private contractors. Earlier, Pomona arranged for Fort Worth to donate a surplus fire truck to the Navajo Fire Department.

Enfield is active in the community as a volunteer and serves in the Department of Public Safety of the Navajo Nation. He is also President of the Navajo Nation Fire Department and President of the Window Rock High School Vocational Advisory Committee.

## Tours to Orient Well Received

The first "Window to the Orient" tour, which returned on May 26th from Korea, Japan and Hong Kong, has received high marks from participants, according to survey forms they filled out after their travel was completed.

A second tour, consisting of 42 participants and two escorts, left for the Orient on June 16th, and reservations are now being accepted for the September and October departures.

The tours are being offered by General Dynamics to employees, their families, retirees and friends through the Ask Mr. Foster Travel Service, toll free phone 800-321-9553.



## Course on Oral Presentations Is Successful

More than 200 employees at Convair in the past 15 months have received an intensive training course in "Effective Presentations," a program designed to improve their presentation styles and make their presentations more effective.

The course is taught by Dr. Gail Dimittioff and Norm Keith of the Industrial Relations Department's educational services group.

As a part of the class, students give individual and group practice presentations, which are videotaped to allow them to see themselves as others see them. During the replay, the students also benefit from positive criticism from the instructors and other class members.

The students practice and review proper dress, posture, gestures, eye contact, preparation of visual aids and communications skills. They also learn how to make presentations using two projectors.

William H. Lowe, Director of Systems Engineering, said he has noted considerable benefits from the course. "We have seen substantial improvement in presentations made by those members of our department who have completed the course," he said.

The Electronics and Data Systems divisions also are conducting similar classes for their employees as an on-going program for presentation improvement.

## Convair Quality Circles Receive Words of Praise

"People have learned to work together on projects."

"It gets the hands-on workers involved."

"I'm more involved in the department. I'm more interested and want to help."

"We (supervisors) now have a better sense of the reality of the workflow."

"They increase my pride in my job and make me more respectful and understanding of co-workers' jobs."

Those were some of Convair employees' comments that were received recently in a division informal survey on Quality Circles. The common themes of improved communications and worker involvement which lead to improved product quality and productivity ran through most of the comments.

Quality Circles at Convair have been instrumental in developing new methods of controlling work schedules, making them more visible to each employee and increasing the awareness of the need for communication among all segments of the workforce, according to Dennis R. Dunbar, Program Director-Atlas/Centaur.

"Enthusiasm for the Quality Circle program goes beyond the factory floor," Dunbar said. "Management is also seeing the benefits in concrete terms." Dunbar was an early supporter of Quality Circles when he was Program Director of the 767 Strut Program, and he is now expanding them into the Atlas/Centaur program.

Dunbar said, "The competition for business in Convair's product areas is fierce. Productivity gains are essential to keep an edge-winning business and keeping jobs at Convair. We recognize that our employees are the real experts on how to get their jobs done efficiently. Quality Circles provide an effective mechanism for focusing the talents of our workforce in clearing away obstacles to improved productivity and to continued Convair sales and job stability."

During 1983, Convair had 50 Circles operating within the division. Bruce Marshall, supervisor of Motivational and Cost Reductions Programs, said that at least 25 Circles are to be added in 1984.

"Convair's experience so far bears out one of the fundamental principles of Quality Circles: it is often a good idea to ask the person who does the work how to do it the best way," Marshall said.

## Around the World... ..in GD

**CHQ:** James Steffes joined as Internal Auditor . . . Joseph J. Dix as EDP Auditor . . . Fred F. Gurr transferred from Pomona and was promoted to Corporate Marketing Manager-Far East . . . Steven E. DeBry transferred from Pomona and was promoted to Contracts Specialist . . . Linda S. Vandas was promoted to Corporate Cash Planning Manager.

**Fort Worth:** Walter D. Brannon, Terry R. Burd and Frank N. Cardillo were promoted to Production Management Specialist . . . John F. Buckley and Billy R. Dingler to Logistics Chief . . . Randy Burnside, Jay S. Jayroe and William I. McHenry to Marketing Manager . . . John D. Castleman and Jeff L. Howard to Field Service Engineer . . . Bobby R. Clanton to Logistics Supervisor . . . Samuel R. Deviney to Purchasing Agent . . . Donald R. Elmore, Charles L. Hagler, Robert J. Helm, Robert H. McDaniel, James D. McEachern and Richard D. Snider to Program Administrator . . . Thomas J. Estes to Material Planning Supervisor . . . Timm L. Fair to Finance Manager . . . Robert D. Garrett to Material Estimating Chief . . . Warren F. Harber to Senior Field Engineer . . . Ricky L. Head and David L. Patenaude to Material Planning Specialist . . . Gerald D. Hess and Sam Pressler to Material Cost Supervisor . . . Charles E. Martin to Engineering Program Manager . . . Lawrence E. Martin to Material Planning Chief . . . Robert D. Maxey to Contract Administration Manager . . . James R. McCurdy and Evelyn M. Minor to Project Coordinator . . . Vivian P. Mock to Manufacturing Technology Engineer . . . Roy C. Pipes Jr. to Material Program Administrator . . . George A. Rickey to Logistics Group Engineer . . . Rowland B. Rugeley to Senior Engineer . . . Henry J. Sherrer Jr. to Assistant Project Engineer . . . Winton F. Sutton to Project Manager . . . John T. Truss to Industrial Engineer . . . Harold M. Walthall to Material Advisor . . . Ronald G. Williams to Project Tool Engineer . . . Kenneth E. Wood to Program Specialist . . . Linda S. Zimmerman to Senior Buyer.

**Convair:** David L. Browning was promoted to Engineering Manager . . . John S. Brumley, Paul M. Jones, Andy J. Sibley and Norman L. Taylor to Operations Supervisor-Manufacturing . . . Joseph D. Catlin to Plant Protection Supervisor . . . Milburn D. Myers Jr. to Procurement Supervisor . . . Steven A. Kewley to Checking Group Supervisor . . . Stuart D. Phelan to Group Engineer.

**Electronics:** George A. Andert was promoted to Engineering Section Head . . . William Doroshuk and Robert A. Pusch to Operations Section Head . . . Jean A. Guenther to Logistic Programs Coordinator . . . William T. Wehner to Operations Project Manager.

**Pomona:** Fred Bauer was promoted to Manufacturing Development Specialist . . . Leonard D. Boortz to Master Schedules Analyst . . . Glen P. Bustin, Gail E. Hetrick and Robert W. Muir to Production Control Supervisor . . . Brent A. Holtzen and Dean L. Kurtz to Project Engineer . . . Larry T. Lester, Victor Marrufo and Chancy Dawson to Manufacturing Supervisor . . . Douglas J. McCroskey to Quality Assurance Project Engineer . . . Dorinda B. Otto to Systems Analyst . . . William M. Reddig to Production Support Chief . . . Denise L. Rodgers to Senior Staffing Representative . . . Samuel C. Scull to Facilities Specialist . . . Marlene J. Sheckler to Manufacturing Development Engineer . . . William G. Wagner to Project Administrator . . . Richard P. Williams to Program Administration Manager . . . Lawrence W. Gault, Donnie L. Hale and Standley Surlata to Project Coordinator . . . Everett E. Hambly to Section Head . . . Linda S. Ruppert to Engineering Group Supervisor . . . Clyde M. Shaver to Procurement Chief . . . Gary S. Smith to Standards Laboratory Engineer. At Camden, Walter W. Clay to Facility Chief . . . Gary L. Maultin to Design Engineer . . . Jack Russo Jr. to Technical Procurement Administrator . . . Janice E. Barron to Supervisor Manufacturing.

**GDSC:** Mary C. Linder transferred from Corporate and was promoted to Industrial Relations Representative . . . Dennis E. Fiehler transferred from Corporate and was promoted to Financial Planning Manager.

**Datagraphix:** Francis P. Baginski, Milt Lockett, Gerry Owings and Chris Christofersen were promoted to Production Manager.

## Savings and Stock Investment Values

Salaried	April 1982	April 1983	April 1984
Government Bonds	\$ 2.9173	\$ 3.5110	\$ 3.7305
Diversified Portfolio	2.0116	3.1392	2.9490
Fixed Income	1.3292	1.4862	1.6678
Hourly			
Government Bonds	2.9171	3.5090	3.7289
Diversified Portfolio	2.0431	3.2074	3.0030
GD Stock	\$28.6481	\$50.3750	\$50.2500

## A. McGinty Wins California Skill Olympics

For the second time in two years, a Pomona employee has placed first in the California Vocational Industrial Clubs of America (VICA) Skill Olympics.

This year's Gold Medal winner is Aaron McGinty, a new tool and die apprentice, who scored the most points ever made in the state-level contest — 238 out of a possible 240. He will represent California in

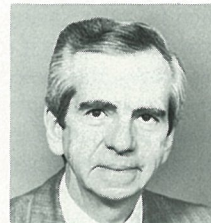
the National VICA competition in Louisville, Ky., June 25th-30th.

Last year, Dan Rojas, a tool and die trainee at Pomona, placed sixth in the machining contest at the International Skill Olympics in Austria after having placed first in the California and national competitions.

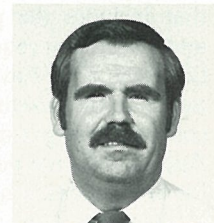
## Jones and Blok Named to New Posts in Turkey

Two Fort Worth employees who have been working in the administration of F-16 coproduction programs in Europe were recently promoted and reassigned in Turkey, where a new factory is being built to manufacture F-16 Falcons for the Turkish Air Force.

Jerry R. Jones has been appointed Vice President-Turkey Joint Venture and Jan Blok has been appointed Director of Operations-Turkey.



Jones



Blok

In his new post, Jones will be General Manager of TUSAS Aerospace Industries, Inc., a company jointly owned by General Dynamics and TUSAS, a Turkish firm. Jones also was elected Deputy Chairman of the Board at the new company's first Board of Directors meeting. He was formerly European Program Director-International in Brussels, Belgium.

Jones has been with General Dynamics 36 years: 23 years at Fort Worth, five at Convair and eight in Brussels. He has held manufacturing control, master scheduling, industrial engineering and estimating positions. In his most recent assignment, he was responsible for monitoring the manufacture and assembly of F-16 aircraft by the European coproducers.

Jones holds a Bachelor of Business Administration degree from Texas Christian University and has completed graduate studies in Stanford University's Executive Training Program.

Blok formerly was Country Manager for the Netherlands' F-16 coproduction program in Amsterdam.

He joined General Dynamics in 1977 as a senior tooling engineer at Fort Worth and was assigned in the Netherlands with the same classification in 1978 to assist in that country's F-16 coproduction effort. He became Chief of European Coproduction in 1979 and European Resident Office Manager-The Netherlands in 1981. Blok has 19 years of experience in the aerospace industry and holds a Bachelor of Science degree in Engineering from the University of Southern California. He also attended universities in the Netherlands, where he was born.

## First Two Production Alternate Fuel Pylons Delivered to USAF

The first two production units of Fort Worth's alternate fuel pylon were recently delivered to the U.S. Air Force. The jettisonable pylons, used to hold 370-gallon fuel tanks, are suspended from F-16 wings during long-range missions.

The new pylons are functionally identical to the older ones they will replace but incorporate material and structural changes that will save an estimated \$5.5 million in manufacturing costs through fiscal 1985. Fort Worth is now building both the old and new type pylons in a gradual phase-in program.

The first units were sent to an Air Force F-16 unit at Torrejon Air Base, Spain.

## GD World

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# Electric Boat and Navy Join in Major Ship Technology Program

By Jim Reyburn

Electric Boat and the U.S. Navy are teaming up in a major program to boost productivity and quality that is expected to have long-lasting effects at the corporation's largest division.

The joint effort has resulted in the Shipbuilding Technology Program, which now potentially includes some \$18 million worth of capital improvement projects at Electric Boat's Groton, Conn., shipyard and its Quonset Point, R.I., hull fabrication facility. Projected annual savings on these projects add up to \$6 million.

The program, which grew out of a 1982 technology modernization study, works this way: Electric Boat proposes a project that includes the potential cost savings and investment required and submits it to the Navy. If the Navy approves, the project moves to the development stage, in which cost and savings estimates are made firm. Approval at that point gives the go-ahead for implementation.

Currently, there are several projects in the development and implementation stages. Those being implemented now are:

• **Machine Shop Modernization** — This calls for the installation of six computer numerically controlled "machining centers" — four at Quonset and two in Groton. The centers, capable of boring, milling, tapping and other functions, are three to four times faster than the older manually operated machines that have been in use for a number of years. Each center carries a number of different tools in an automatic tool changer. Tool changers carry 48 to 100 different tools, depending on the machine. Two centers are already in operation at Quonset. Another two are on order and will be installed and operating by the end of next month. The two for Groton will be received early in 1985.

• **Hull Blast Articulators** — These are self-propelled aerial work platforms with a four-nozzle head that can be programmed to automatically blast or paint components or entire submarines. Four of these will go into operation next month in Groton.

## Two Fort Worth Films Rate High at Festival

Two films made at Fort Worth received special recognition in the recent 1984 Best of Texas Competition at the USA Film Festival in Dallas.

"Thunderbirds - The Legend Lives On" won first place in the Informational Category. The film on the U.S. Air Force's Air Demonstration Squadron features photography of the team's F-16s, the preparations that are made before a Thunderbirds show and precision flight maneuvers. It was produced and directed by Greg Hubbard, written by John Stevens, edited by Bob Simons and filmed by Nick Alvarado and Gary Tolbert, all of the Multimedia Department.

"Out of the Sun" received an honorable mention certificate as one of the top films in the Documentary Category. Written and produced by Bob Cunningham of Marketing, the film explores the history of aerial combat and is a continuation of Cunningham's work in writing and illustrating the book "Aces High." It features interviews with a number of renowned aces from wars in which combat aircraft were used, from World War I to Vietnam, and actual combat footage obtained from military sources. It was directed and edited by Simons and filmed by Alvarado, Tolbert and Bob Waldrop of Multimedia.

## Govette Elected

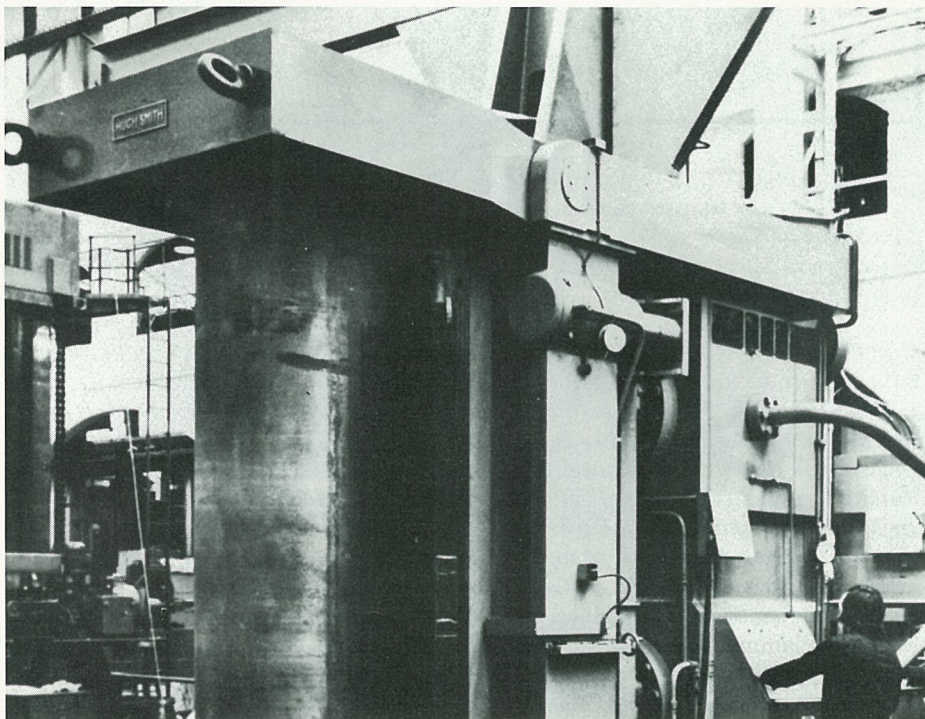
William H. Govette, Vice President of Fabrication and Assembly at Pomona, has been elected President for 1984-85 of the Board of Directors of the California Vocational Industrial Clubs of America (VICA) Leadership Foundation.

In this position, he will help to develop leadership abilities and continued interest in vocational education for students enrolled in vocational and industrial classes.

The four projects approved for development under the program are:

• **Quonset Point Blast and Paint Facility** — This new building would consolidate and modernize Quonset's blasting and painting operations and would increase its capacity for such work, now

limited by the current facility's size. Preliminary concepts call for a multibayed building to handle both large and small components. A centrally located "core" would contain support systems — hoppers to hold blast grit, air compressors for the painting apparatus, shot recovery



**Machine Modernization,** *Electric Boat and the Navy have joined in a capital improvements program that is modernizing shipbuilding machines and facilities at the division. Shown above is a 5,000-ton vertical plate bender included in the program that will be a main feature of a new Heavy Steel Forming Facility at Quonset Point, R.I.*

equipment and a temperature humidity control center. The facility is targeted for operation in mid-1985.

• **Quonset Point Heavy Steel Forming Facility** — This new building would consolidate heavy steel processing — cutting, burning, welding and forming — now performed in several locations at Quonset. Focal point of the building would be a 5,000-ton vertical plate bender that would provide greater forming accuracy than the horizontal plate rollers now in use. Bridge cranes would move the steel through the building. Completion is expected by mid-1985.

• **Automated Cutting and Handling Process for Pipe and Bar Stock** — This would automate the cutting and handling process in the Quonset warehouse. A computer numerically controlled cutting machine and an associated material feed system will provide for more speed and efficiency in that operation, which is now performed manually. Completion is expected by mid-1985.

• **Automatic Storage and Retrieval** — The main storehouse material at Groton would be retrieved at the press of a button by large carousel conveyor units, speeding the retrieval process. Completion is expected by early spring, 1985.

The program will not end after these projects are completed. There are several others in the preliminary stages of consideration, and any new projects will continue the shipbuilding technology program well into the future.

## GD Flashback

### Tank-Building Tradition Began with M-3 in WW II

The Land Systems Division has a proud tradition of producing outstanding main battle tanks, with its first tank setting the standard more than 43 years ago.

Land Systems' first armored combat vehicle was the M-3 medium tank, which it began producing in 1941 while the division was a subsidiary of the Chrysler Corporation. The M-3, also known as the Lee and later the Grant, earned immediate recognition for the company by figuring prominently in British victories over the German Afrika Korps in North Africa in early World War II.

A London newspaper at the time said, "Although they have not been long in action on the Libyan front, the U.S. General Grant tanks have already earned a brilliant reputation."

The M-3 was supplied to the British under the Lend-Lease Act, and they promptly named it in honor of General Robert E. Lee. Shortly after, the British Government requested modifications — including an elongated turret — to meet British Army requirements and bought these modified M-3s directly. They named this version in honor of Ulysses S. Grant. The Lees and Grants were the first American tanks sent to British troops fighting the Germans and Italians in North Africa. They were received with great enthusiasm by the British 8th Army, which now had an armored vehicle capable of meeting German tanks on equal terms.

At the time it became operational, the M-3 was the world's most heavily armed vehicle for its weight. It weighed 28½ tons, had a maximum armor thickness of 57-mm., could travel a maximum of 28 miles an hour on roads and had a maximum radius of 108 miles. It had a crew of six and was armed with a 75-mm. gun on the hull, a 37-mm. gun in the turret and four .30-cal. machine guns. Early M-3s were powered by a Wright Continental R-975 engine, a 9-cylinder, radial, air-cooled engine developing 340 horsepower. Later versions had different engines as the Wright came into short supply.

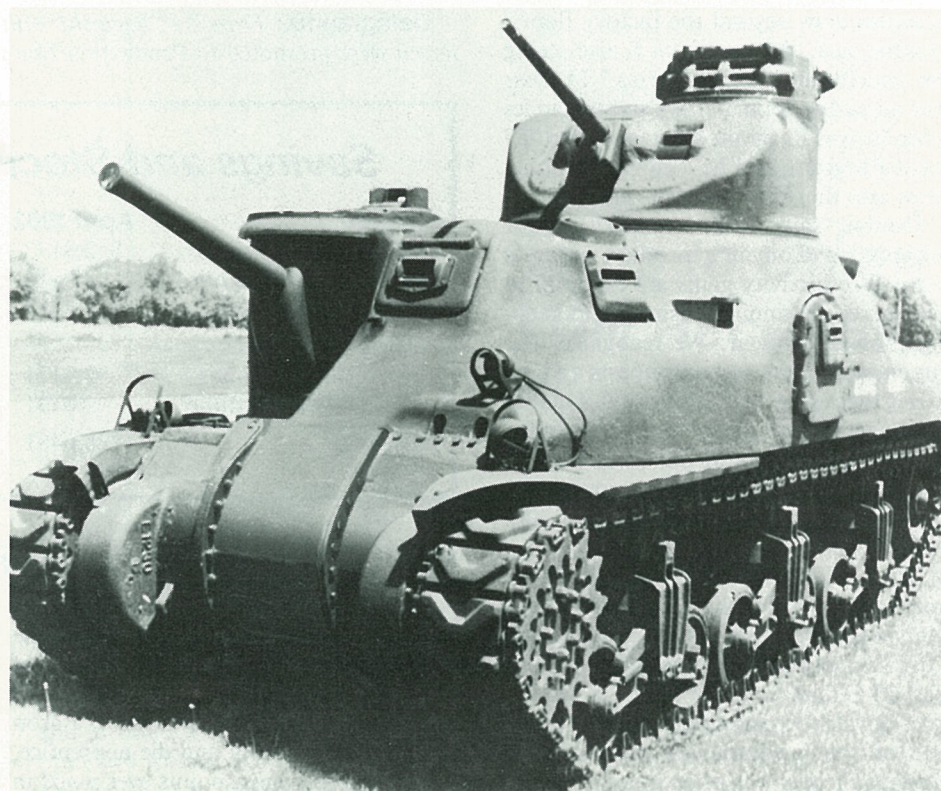
Oddly, the M-3 had greater firepower than its bigger, heavier-armored successor, the 32-ton Sherman. This, however, was due to a drawback in the M-3's design. The M-3 carried its 75-mm. gun well down the right side of the hull, where its angle of fire was restricted. It was obvious that the place for this large gun was in the turret where it could fire in any direction, so this change was made with the Sherman, and the 37-mm. cannon was not included in the newer tank's design.

The M-3 was the first American medium tank to be produced in quantity prior to the U.S. entry into the war. The U.S. Army on Aug. 15, 1940, awarded Chrysler a contract for 1,000 M2A1 tanks, which were then being produced only at the Rock Island (Ill.) Arsenal in small numbers. Since Chrysler was just getting into the tank-manufacturing business and had no production facilities of its own, the contract was based on the planned construction of a new Army plant at Detroit.

Thirteen days after the contract was signed, the Army canceled the order for the 23-ton M2A1 tank, which was designed in 1939, and replaced it with one for the M-3, which was still on the Army's drawing boards. The Army general staff had concluded that the M2A1 was not good enough for combat, based on reports from Europe, and would be obsolete before it could be produced at Detroit. The M-3 was pushed to production as a hurried answer to the German blitzkrieg.

Land Systems' first test tank was rolled out in April 1941, and the first production tank was completed on July 8, 1941, actually about three months before the plant, itself, was fully constructed. The Chrysler-operated Detroit plant delivered 3,352 M-3s in six basic production versions by the time the M-3 was succeeded on the assembly line by the M-4 Sherman on Aug. 3, 1942.

Although overshadowed later by the newer Sherman, the M-3 Lees and Grants gave the division a solid foothold in tank manufacturing at a time when the British badly needed an answer to the shortcomings of their own tank designs. The first American M-3s arrived when British military operations in North Africa were at a low ebb, and many saw long service. They chased the Germans and Italians across the desert and were still fighting in Tunisia when what was left of the Axis armies finally surrendered. A British official gave this unsolicited testimonial: "The Grants and the Lees have proved to be the mainstay of the fighting forces in the Middle East; their great reliability, powerful armament and sound armor have endeared them to the troops."



*Land Systems' First Main Battle Tank, the M-3*



## Two Tomahawk Missiles Complete Key Test Flights

Two Convair-built Tomahawk missiles made successful dive attack and antiship mission test flights last month.

The first Tomahawk cruise missile successfully demonstrated its terminal dive method of attack in the first of a series of developmental test flights.

After launch from an armored box launcher on the deck of the Navy destroyer USS *Merrill*, the missile flew a fully guided land attack mission of more than 400 miles to a target area at the Tonapah Test Range in Nevada. Once inside the target area, the missile hit its simulated target, successfully demonstrating the missile's terminal guidance accuracy.

The conventionally armed land attack Tomahawk missiles previously tested have used a horizontal mode of attack. A terminal climb and dive allows for better accuracy against ground targets.

Another Tomahawk successfully conducted an antiship mission in an operational test off the Southern California coast. After launch from the submerged USS *Houston*, the Tomahawk again demonstrated its ability to search for, locate and attack a target at sea. After flying over the target hulk, the missile was recovered, using its parachute recovery system.

The conventional land attack Tomahawk with the improved terminal maneuver is scheduled for deployment aboard surface ships and submarines in 1986. Initial fleet capability of both the conventional land attack and the antiship variants of Tomahawk was achieved aboard the battleship USS *New Jersey* in March 1983. The antiship Tomahawk also achieved fleet introduction aboard submarines in November 1983.

The Tomahawk cruise missile in all its variants is in production by Convair, under the direction of the Joint Cruise Missile Project.

## Trident Submarine Henry M. Jackson Starts Sea Trials

The nation's fifth *Ohio*-class Trident ballistic missile-firing submarine, *Henry M. Jackson* (SSBN 730), returned to Electric Boat early this month after successful initial sea trials.

The sea trials were performed under the direction of Adm. Kinnaird R. McKee, Director of the Naval Nuclear Propulsion Program. The ship was commanded by Capt. Ralph Tindal of State College, Pa.

Senior Electric Boat officials aboard were Fritz Tovar, Vice President-General Manager; Curtis Shellman Jr., Division Vice President-Operations, and Herbert Berry, Division Vice President-Engineering. General Dynamics Executive Vice Presidents Lester Crown and James R. Mellor were also on board for the trials.

*Henry M. Jackson* is scheduled for delivery this fall. Four of the 560-foot, 18,750-ton Tridents have been delivered and another six, in addition to the *Jackson*, are under construction at Electric Boat.

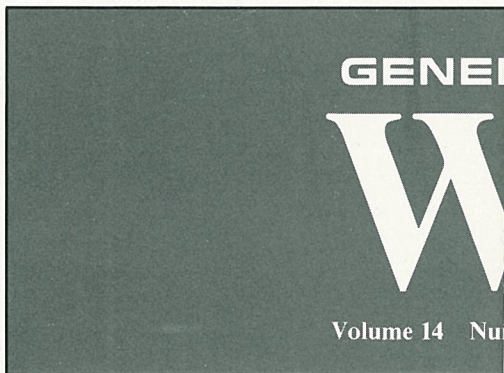
## Fokker Reaches Two Milestones In F-16 Program

The F-16 coproduction program at the Fokker plant near Amsterdam, the Netherlands, reached two milestones recently: delivery of the final aircraft of an initial 72 to the Royal Norwegian Air Force and delivery of the 100th F-16 to the Royal Netherlands Air Force.

The events were marked with a joint ceremony during which Maj. Gen. A.K. Sejinaeas of the Royal Norwegian Air Force, and Maj. Gen. H. Boekennoogen, Materiel Director of the Royal Netherlands Air Force, accepted the aircraft for their countries.

Representatives of the U.S. Air Force; Royal Norwegian Air Force; Royal Netherlands Air Force; Belgian Air Force; U.S., Dutch, Norwegian and Belgian governments; Fokker and General Dynamics attended.

The first F-16 built for the Netherlands was delivered in June 1979, and that country has ordered a total of 213. Norway received its first F-16 in January 1980. It originally ordered 72 Falcons and has announced plans to purchase 24 additional F-16s.



GENERAL DYNAMICS

Pierre Laclede Center, St. Louis, Missouri 63105

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JULY 84

## Advanced F-16C Falcon Makes First Flight at Fort Worth

The F-16C, an advanced version of the operationally proven F-16A Falcon, was flown for the first time last month at Fort Worth, validating performance improvements under a three-phase program that began in 1981.

The first F-16C will be formally delivered to the U.S. Air Force in ceremonies at Fort Worth later this month.

The aircraft will remain at Fort Worth to support U.S. Air Force technical order validations. In December, it will be ferried to Luke AFB, Ariz., for operational test and evaluation.

Upgrades to the aircraft will enable the F-16 to operate effectively in all weather and at night and will significantly enhance the Falcon's combat superiority, survivability and precision navigation capability.

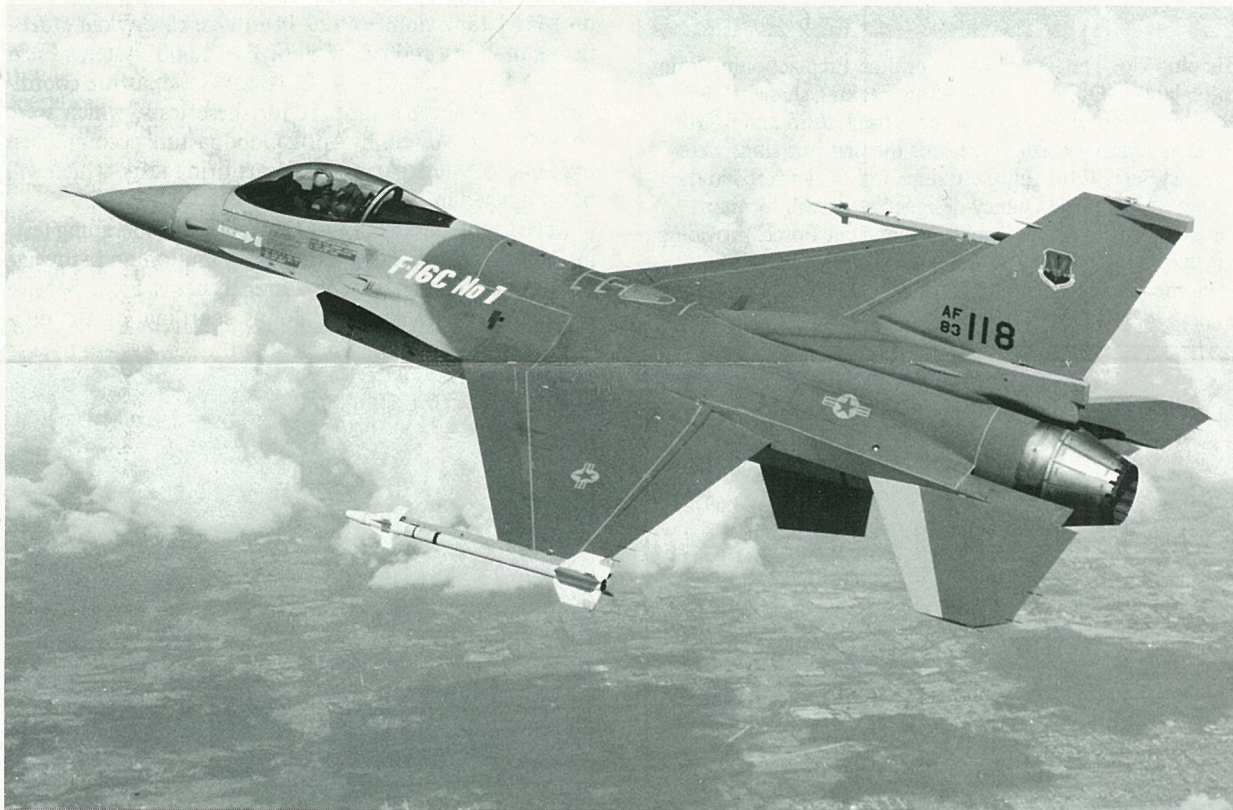
For more than 18 months, two F-16 aircraft which have been modified to the C/D configuration have been in a flight test program at Edwards AFB, Calif.

AFB, Utah, in January 1979, the F-16 fleet has amassed more than 500,000 flight hours in service throughout the Free World.

Shortly after that first delivery to the 388th Tactical Fighter Wing at Hill AFB, planning for the major systems improvements was initiated.

The three-phase, preplanned improvement package, called the F-16 Multinational Staged Improvement Program (MSIP), was established to provide orderly production incorporation and facilitate retrofit of the advanced aircraft systems.

Stage I of the program provided early structural and wiring provisions beginning with production of Block 15 F-16A/B aircraft in November 1981. Earlier that year, full-scale development was started on MSIP Stage II for the current F-16C and its companion two-seat operational trainer, the F-16D. The F-16D will make its first flight



Fort Worth's Advanced F-16C in Flight Over Texas

Externally, the F-16C looks like the F-16A except for a slightly expanded vertical tail root fairing. Internally, however, there are many differences, including:

- An APG-68 radar which offers much greater range, resolution and modes of operation than the current APG-66 radar.
- Advanced cockpit with upfront controls, multifunction displays, a wide-angle head-up display and mission data transfer equipment.
- Increased capacity in electrical power and cooling systems.
- Expanded memory, speed and reprogrammability of computers, dual avionics multiplex bus architecture and advanced computer language.
- Structural changes for increased takeoff gross weight, maneuvering limits and advanced growth.

These basic improvements, some of which will be retrofit to F-16As now in operational service, will provide compatibility with advanced USAF systems now under development, including Advanced Medium Range Air-to-Air Missiles (AMRAAM), Low Altitude Navigation Targeting Infrared for Night (LANTIRN), Airborne Self-Protection Jammer (ASPJ) and the ALR-74 radar warning receiver.

"The F-16 is thus assured to be a highly capable yet still affordable front-line multimission fighter into the late 1990s," said Herbert F. Rogers, Vice President and Fort Worth General Manager.

More than 1,200 F-16 Falcons have been delivered to the USAF and eight other nations under the largest multinational defense coproduction program in history. Nearly 2,800 more are scheduled for delivery through 1994.

Since the first production F-16A was delivered to Hill

later this year.

Stage III will be later in the decade when the advanced systems such as AMRAAM and ASPJ are initially delivered to the USAF.

In addition to the USAF, air forces of Korea, Egypt, Israel and Turkey are scheduled to receive the advanced F-16C/D aircraft.

Production of F-16A/B aircraft, as well as the F-16C/D, will continue at Fort Worth and at the two coproduction facilities in Belgium and the Netherlands. Coproduction work will also be done in Korea and Turkey.

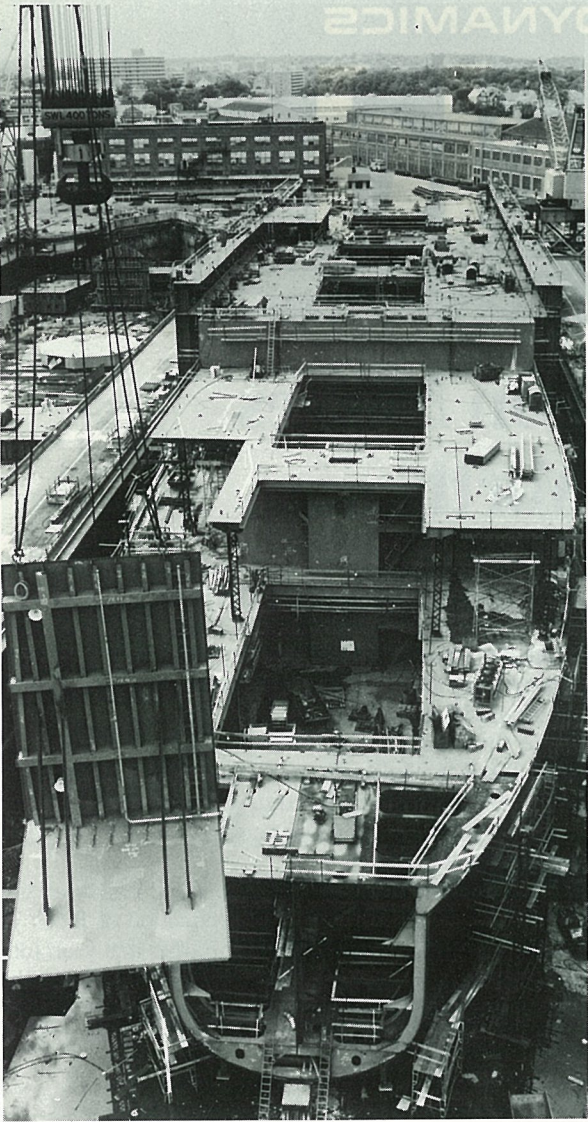
## Electronics Division Aids F-16C/D Testing With AIS Sets

Electronics Division has delivered the first two developmental shop sets of the Avionics Intermediate Shop (AIS) for the F-16C and F-16D versions to Fort Worth.

The new shops will provide increased testing support on the new aircraft. They are now in the midst of a two-year engineering evaluation and integration test program at Fort Worth.

First production shops in the new configuration are due for delivery in late 1984. Electronics Division has delivered 170 F-16 AIS shop stations to users of the F-16 Falcon around the world.





**Shaping Up.** The first of five Maritime Prepositioning Ships to be built at Quincy Shipbuilding is taking shape while construction is under way on the second, third and fourth ships in adjacent berths. Keels for the first two ships were laid last Sept. 16th, and these ships will be delivered in the spring of 1985. The Quincy-designed ships will form an integral element of the Rapid Deployment Force, providing for the rapid deployment of a large combat force with equipment and supplies for 30 days of sustained operations.

Savings and Stock Investment Values			
Salaried	May 1982	May 1983	May 1984
Government Bonds	\$ 2.9671	\$ 3.4923	\$ 3.6977
Diversified Portfolio	1.9268	3.1051	2.7811
Fixed Income	1.3413	1.5006	1.6843
Hourly			
Government Bonds	2.9643	3.4906	3.6960
Diversified Portfolio	1.9665	3.2495	2.8271
GD Stock	\$25.7500	\$52.3750	\$45.0000

## McGinty Wins VICA Olympics

Aaron McGinty, an 18-year-old apprentice machinist at Pomona, has topped 64 competitors in the Precision Machinist category of the Vocational Industrial Clubs of America (VICA) National Skills Olympics.

He received the Gold Medal at the June 29th award ceremony of the VICA National Leadership Conference held in Louisville, Ky., recognizing him as the No. 1 precision machinist in the United States.

McGinty won the California VICA competition in May after earning the regional title in March.

He will participate in a runoff competition with the second and third place winners this year and the three top national winners from 1983. The runoff, to be held in Cincinnati, Ohio, in October, will determine the United States' representative at the biennial International Olympics to be held in Japan in 1985.

**GENERAL DYNAMICS**

# World

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## Coleman and Hapke Named to Corporate Office Posts

Two appointments have been announced at the Corporate Office: James C. Coleman has joined General Dynamics as Staff Vice President-Personnel Relations, and Daniel S. Hapke Jr. has joined the company as Corporate Assistant Legal Counsel.

Coleman's responsibilities will include working with the divisions in compensation, personnel planning and placement and in executive development and training functions.

He has 21 years' experience in increasingly responsible management positions in Personnel and Employee Relations. His most recent assignment was as Director of Human Resources for the Industrial Truck Division of the Clark Equipment Company, Battle Creek, Mich. He had been employed at Clark since 1966 where he also held the positions of Corporate Industrial Relations Manager, Plant Employee Relations Manager and Personnel Manager.

Coleman received a Bachelor of Science degree in Personnel Management and Industrial Psychology from Western Michigan University in 1962. He has completed graduate courses at Western Michigan and Butler universities.

Hapke, 37, had been Staff Attorney and Assistant Corporate Secretary at Sverdrup Corporation, St. Louis.



Coleman



Hapke

Prior to joining Sverdrup in 1975, he had been with the St. Louis law firm of Klamen, Summers & Compton since 1973.

A native of St. Louis, Hapke received a Bachelor of Science degree in Psychology and Marketing in 1968 and a law degree in 1974, both from St. Louis University.

He served on active duty as an officer with the U.S. Navy from 1968 to 1971.

Hapke is a member of the St. Louis, Missouri and American Bar associations.

## M1E1 Battle Tank Goes from Cold to Hot In Arctic/Tropic Environmental Testing

From Alaska to Panama, M1E1 tanks have been subjected to a variety of environments during their developmental testing by the U.S. Army. Tests were conducted on M1E1 tank number 120-14 in Alaska on cold starts, firing, mobility and use of arctic kits. Land Systems Field Service Representative W. C. (Bud) Goodpasture coordinated the division's support for these tests, which were completed in March. In April, Goodpasture accompanied the tank to Yuma, Ariz., for desert firing tests, which will be completed in August.

M1E1 tank number 120-11 currently is undergoing tests in Panama on mobility, firing, ammunition and stowage operations. The tests, with Land Systems Field Service Representative William A. Johns coordinating the divi-

sion's support, will be completed in December.

The M1E1 tank is an improved version of the M1 Abrams main battle tank. It replaces the M1's 105-mm. main gun with a 120-mm. cannon, giving the tank the capability to defeat any anticipated armor threat of the future. The M1E1 also has upgraded suspension and transmission systems, upgraded armor protection and an over-pressure air system to provide nuclear, biological and chemical protection.

The developmental tests by the Army will verify the tank changes before the M1E1 is released for production. The M1E1 is expected to enter the Army inventory in 1985 and will eventually make up more than 50 percent of the total Abrams tanks produced.



M1E1 Undergoes Testing in Panama

## Providence Launch Set for Aug. 4th

The first ship of her class designed to fire the Tomahawk cruise missile from vertical launch tubes will be launched Aug. 4th at Electric Boat's Groton, Conn., shipyard.

The SSN 688-class fast-attack submarine *Providence* (SSN 719) is scheduled to slide into the Thames River after being christened by Mrs. William French Smith, wife of the Attorney General of the United States. Her husband will deliver the principal address.

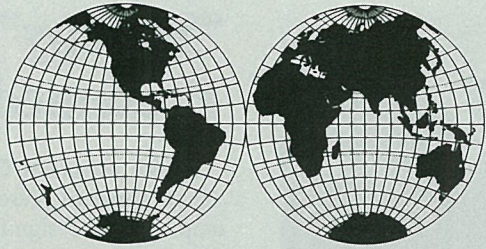
*Providence*, named for Rhode Island's capital city, is the first submarine and the fifth U.S. naval ship to bear the name. Three predecessors, a 12-gun sloop, a 28-gun frigate and a gundalow, a small sail and oar-powered gunboat, served in the Revolutionary War.

The fourth *Providence* (1945-1978), originally a light cruiser (CL 82), was converted to a guided missile cruiser (CLG 5) and won two Navy unit commendations and seven battle stars for her service in the Vietnam conflict.

*Providence* is the 19th ship of her class to be built by Electric Boat. The division has already delivered 17 of the 360-foot, 6,900-ton submarines and has nine others, including *Providence*, in various stages of construction.

The launching will be the third this year at the shipyard. *Augusta* (SSN 710), a sister ship, slid into the Thames River Jan. 21st, and *Alabama* (SSBN 731), the nation's sixth Trident missile-firing submarine, was christened May 19th.





## Around the World

**CHQ:** Kenneth E. Glascock joined as Auditor... Jerry L. Girard joined as Corporate Dayton Representative... J. Andre Richir transferred from Fort Worth and was promoted to Corporate Marketing Manager-Turkey... N. Geoffrey Ingham was promoted to Corporate Manager-Contracts... Freda Monk to Corporate Manager-Planning Operations... Danny H. Sokolowski to Corporate Network Manager.

**Fort Worth:** Karon D. Baskin was promoted to Manufacturing Technology Engineer... David W. Benson Jr., Don J. Blair, Donald R. Brown, Donald J. Duncan, William R. Eads, Kenneth E. Grosgebauer, Lumey D. Jump Jr., Verlin R. Kelly, Daryl D. Marling, John M. Rhodes, Randall W. Thomson, Charles H. Ward and Jack D. Watts to Engineering Chief... Neal F. Bowyer and Bobby J. Kenny to Logistics Engineer... Harold L. Brinkley to Manufacturing Support Equipment Supervisor... James S. Cates and Willie Gesch to Senior Industrial Engineer... John B. Crass Jr. to Engineering Program Manager... Philip L. Currier and Charles M. Scott to Engineering Manager... Tony W. Docken to Quality Control Field Engineer... Donald A. Elliff to Senior Marketing Representative... Jimmie D. Evans and Charles S. Magness to Project Coordinator... Hal G. Foster and Reginald D. Friend to Senior Program Estimator... Harry O. Gaffin Jr. to Project Engineer... Theodore A. Holt III to Senior Buyer... Thomas L. Reed to Logistics Group Engineer... Harold E. Reeves and Leroy Simmons to Foreman... Richard W. Thornton to Material Program Administrator... William A. Wolf to Marketing Specialist... Ronald C. White to General Foreman.

**Electric Boat:** Paul Aas and Kenneth Onarheim were promoted to Chief Nuclear Test Engineer... Stephen Banks to Technical Services Supervisor... Peter Bartnikowski to Sea Trial Coordinator... John Bentley, Maryanne Tolis and Daniel Williams to Associate Engineer... Paul Brown, Gary Hartley and Kenneth DiGiuseppe to Engineering Supervisor... Robert Browning to Design Services Supervisor... Bruce Caron to Area Manager... Charlotte Cool to Administrative Control Coordinator... Richard Finnigan to Shift Superintendent... Kenneth Gake to Foreman... David Germaine and Jonathan Van Devusse to Project Management Chief... Charles Nixon to Operations Staff Specialist... Harold Robb and Anthony Scarpa to Senior Ship Superintendent... Scott Waring to Operations Staff Specialist... At Quonset Point, James Gulluscio to Manager of Plant Protection... Bruce Bowker and Henry Moretti Jr. to General Foreman II... Joseph Giorgio to Safety Administrator.

**Quincy Division:** Carmine Abbondante was promoted to Estimating Supervisor... Janet Boone to Engineering Planner... Raymond Landreville to Chief Estimator... Augustine Palluccio to Sheetmetal Superintendent... Gerald Theriault, James Deady and Edward Suraci to General Foreman... William Proverb, John Pelletier, Anthony Zaccardi, Richard Frank and James Geagan to Foreman... John Banas, Edward Jordan and Anthony Quigley to Welding Development Analyst.

**Pomona:** Richard S. Fichtner was promoted to Senior

Manufacturing Engineer... Larry L. Griffin to Senior Procurement Representative... Michael W. Hudekoff to Project Coordinator... Jeffrey D. Torrey to Senior Technical Data Management Analyst... Charles W. Wenborne to Senior Facilities Specialist... Robert W. Wheeler and Robert L. Sorenson to Section Head... Harry C. Chambers to Program Manager... Mark L. Greenwood to Senior Research Engineer... Marvin R. Huth to Factory Manager... Ivan G. Kaufman to Group Engineer... Donald L. Risk to Estimating Chief... John R. Schemers to Quality Assurance Specialist... David C. Mason to Manufacturing Group Engineer... Donald D. McColgan to Project Engineer... At Camden, Charles C. Griffeth to Senior Engineer Standards Laboratory... Hershel L. Price Jr. to Standards Laboratory Engineer... Helen A. Fife to Data Control Supervisor... Walter W. Clay to Facility Chief... At Navajo, Gary Wilson to Quality Assurance Manager... Carl T. Gentry to Production Control Manager.

**Electronics:** William P. Shine was promoted to Engineering Personnel Services Manager... Elizabeth L. Walton to Plant Engineering Manager... Wesley L. Russell to Engineering Section Head... Burt V. Burchette to Program Manager.

**Convair:** Arnold J. Palmer joined from GDSC as Manager of Professional Staffing... Thomas P. Dougherty was promoted to Contracts Manager... John W. Wohlwend to Engineering Chief... Stephen C. Birmingham to Material Operations Chief... Anthony De Couteau to Engineering Manager... Robert R. Disciscio to Numerical Control Operations Supervisor... Linda G. Stephens to Material Operations Supervisor... Dennis E. Coffee to Finance Manager... Raymond L. Corn to Engineering Services Supervisor... Arthur L. Dilley to Quality Assurance Supervisor... Jerry L. Letzring to Procurement Supervisor... Peter C. Morris to Material Control Supervisor... Peter Nickson to Tooling Supervisor... Elizabeth A. Schara to Manufacturing Engineering Operations Supervisor... Patricia K. Hawkins to Manufacturing Control Operations General Supervisor... Philip H. Braun, Suzanne M. De La Torre, Christopher D. Munson and Dewey G. Nelson to Manufacturing Control Operations Supervisor... Robin D. Boyd, Evelyn M. Hummel and Kenneth L. Weingarner to Manufacturing Operations Supervisor.

**DSD:** At Home Office, Joseph W. Guinn was promoted to Hardware/Software Manager... William E. Tucker to Security Manager... Donna K. Gant to Software Engineering Specialist... At Central Center, Herbert C. Conn to Advanced Technology Development Manager... William S. Love and Randy G. Pamplin to Operations Services Supervisor... Joseph A. Martellotto to Business Systems Development Supervisor... At Eastern Center, Pamela A. Gardiner to Production Control Specialist... Robert E. Miller to Senior Programmer/Analyst... Robert A. Pavlat to Engineering Software Chief... Samuel R. Pinder to Operations Services Chief... Timothy E. Thorp to Senior Customer Services Analyst... Toby R. Tourigny to Operations Services Supervisor.

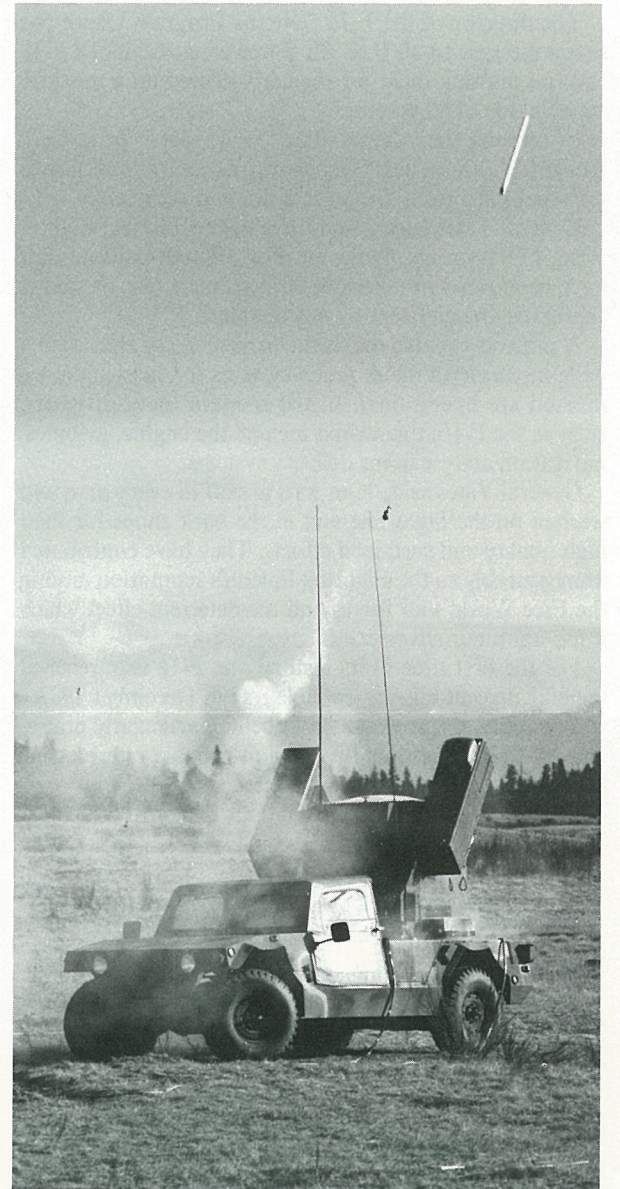
## Stinger Missiles Fired From Utility Vehicle

A series of three Stinger missile firings was successfully completed recently at the Yakima Firing Center near Yakima, Wash. The Pomona-built Stinger missiles were fired from the new Avenger lightweight weapon system built by Boeing Aircraft Company of Seattle, Wash.

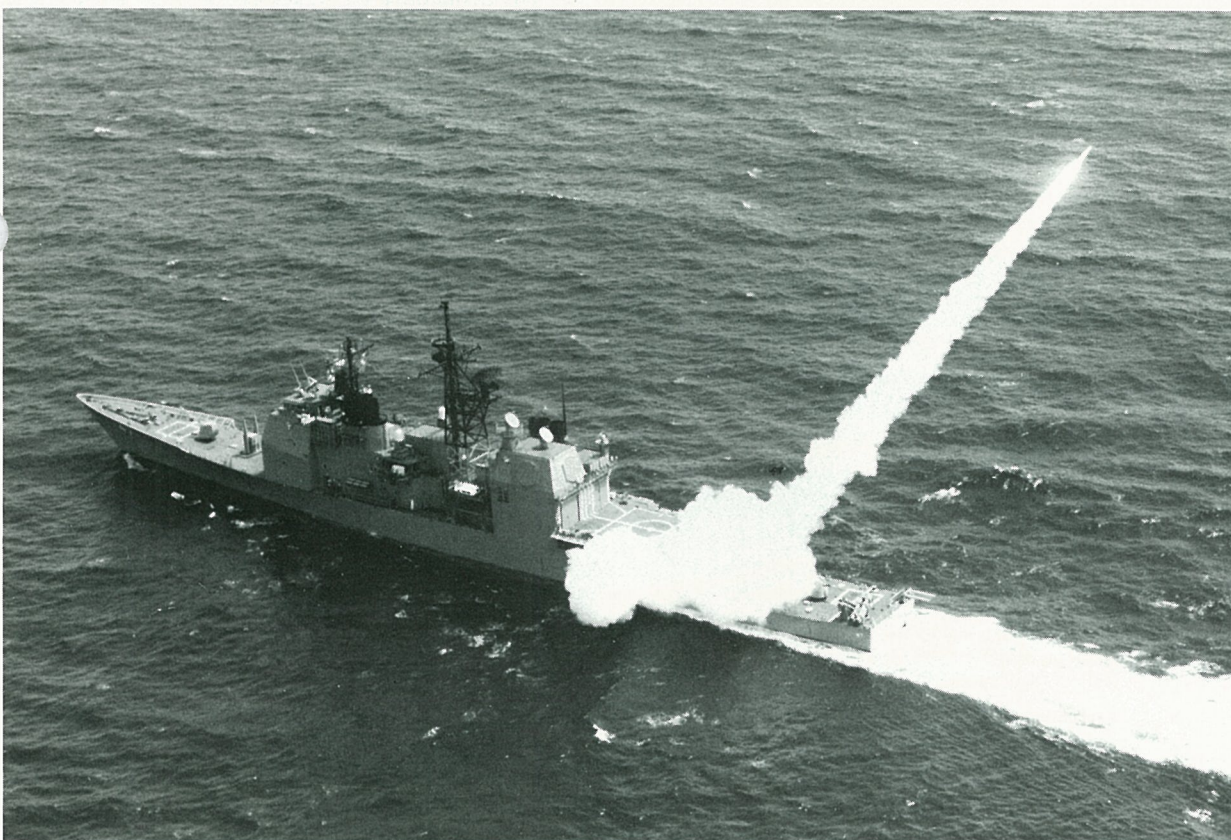
The firings were part of the Annual Service Practice exercises conducted by the 1st Battalion, 67th Air Defense Artillery, 9th Infantry Division (Mechanized), stationed at Fort Lewis, Wash.

Pomona supplied the Stinger Launching System and provided integration, training and field support for the seven-month effort sponsored by the U.S. Army Missile Command.

The Avenger system is a weapons module that mounts in the cargo bed of the new HMMWV cargo utility vehicle currently in production for the U.S. Army. The system's main armament consists of two Stinger launching system pods that contain four ready-to-launch Stinger missiles in each pod.



Stinger/Avenger Fired in Test



The USS Ticonderoga Fires a Standard Missile.

## Standard Missile/Aegis Tests Completed by Ticonderoga

The USS *Ticonderoga*, the first Aegis guided-missile ship in the U.S. Navy fleet, completed at-sea tests of its Aegis Weapon System — including Pomona-built Standard Missile-2 — in the Caribbean near Puerto Rico.

The tests were conducted in heavy seas in tactical exercise conditions as similar as possible to operational conditions. Randomly chosen missiles were used, some of which remained from previous tests in April 1983 and some loaded in October 1983.

The tests, according to Adm. James D. Watkins, Chief of Naval Operations, proved that Aegis performed as predicted, as the best anti-air warfare system the Navy has ever acquired.

"The *Ticonderoga* and the Aegis system have undergone the most extensive testing program ever undertaken, adjusting to state-of-the-art technology as we developed the system," Admiral Watkins said. "For example, the original radar on *Norton Sound* was improved, and the *Ticonderoga* radar is an improved model."

"We have fired 80 missiles from the *Ticonderoga* and 66 missiles from *Norton Sound*... a total of 146 missiles," the admiral said. "The problems which came up in operational testing last year... some system software, some human and some missile... were ironed out prior to *Ticonderoga's* previous deployment to the Mediterranean."





F-16 "Owls" of 363rd TFW at Shaw AFB, S.C.

## USAF Wings Using F-16s Are Cited For Falcons' High Mission Readiness

The director of the F-16 Systems Program Office has sent a message to all U.S. Air Force wings using the F-16 Falcon, praising them for regularly exceeding a mission-capable rate of 80 percent.

In sending the commands a "well done," Brig. Gen. Ronald W. Yates said, "This performance by your units is unprecedented for a fleet of this size and complexity."

General Yates added that three of the Tactical Fighter Wing (TFW) units flying the Fort Worth-built aircraft have been rated in excess of 90 percent, a feat he said is "absolutely magnificent by any standard."

A mission-capable rate is the percentage of aircraft in a wing in which all the required systems for carrying out a mission are operational. In the modern tactical fighter, such as the F-16, this would include the engine, avionics, navigation and weapons delivery systems.

General Yates said, "Our hats are off to every man and woman on the flight line and in the back shops for their high quality and sustained efforts. They have contributed immeasurably to the Fighting Falcon's reputation among the Free World's air forces and the deterrent effect which it has upon our adversaries."

For the first time in its history, the F-16 fleet reached the 80.1 percent mission-capable rate in December 1983.

The achievement was cited as being particularly praiseworthy since, traditionally, mission-capable rates decline in the bad weather months of winter.

In January 1984, the F-16 Systems Program Office ini-

tiated a very aggressive program called "Falcon 80." Its purpose was to enhance USAF combat capability by taking the most mission-ready weapons system in its inventory, the F-16, to a sustained mission-capable rate of 80 percent or higher, something that had never been done.

Results to date have exceeded all expectations, according to USAF officials.

More than 730 Falcons have been delivered to USAF units based throughout the Free World, and in the first five months of this year the fleet flew more than 77,100 hours in training missions. Also between January and May 31st, there were 42 deployments of F-16s to other bases, 10 combat training exercises and three operational readiness inspections.

The 363rd Tactical Fighter Wing at Shaw AFB, S.C., during that period conducted seven of the scheduled deployments and still maintained the best mission-capable rate on record in a modern tactical fighter, 92.7 percent.

The 388th Tactical Fighter Wing at Hill AFB, Utah, and the 8th TFW at Kunsan Air Base, Korea, were within a few tenths of a percentage point behind Shaw.

To date during Falcon 80, the 35th Aircraft Maintenance Unit (AMU) of the 8th TFW achieved an unprecedented 100 percent fully mission-capable rate for the 26 aircraft its ground crews are assigned to service.

The Falcon AMU of the 57th Tactical Fighter Wing at Nellis AFB, Nev., has twice in the last five months recorded a 100 percent mission-capable rate.

## "Snoopy" Quality Awards Presented by Astronaut

NASA astronaut Col. Robert L. Stewart visited Convair in June to present Snoopy awards to six Convair employees for significant contributions to the Space Shuttle.

He presented silver replicas of the famous cartoon character and citation certificates to Ray Benson, Gene Perkins, John Grier, Lloyd Birse, Clarence Dunbar and Milton McCaskey.

Colonel Stewart, who flew in the Shuttle mission last February, was one of the first astronauts to operate outside a spacecraft without a restraining line while testing the Manned Maneuvering Unit.

In remarks during the presentations at Lindbergh Field, San Diego, and at Kearny Mesa, he noted that the Snoopy Quality awards come from the astronauts themselves, not from NASA, and are based on nominations from the contractors. Each of the tie-tack-sized mementos has flown in space during one of the Shuttle missions.

Benson, who has retired, was cited for his work as a mass properties engineering specialist and for his contributions in keeping the Shuttle midfuselage under contractual weight limits.

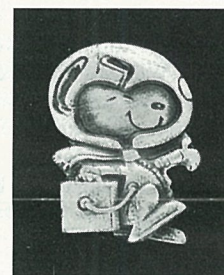
Perkins, a structural design engineer, was responsible for the design of major structural components and helped develop an extremely weight-efficient design, with fabrication and assembly techniques that allowed for low rate deliveries.

Grier was recognized for his contributions in initiating and monitoring planning, tool design, tool manufacturing and shop use and for assisting in the interpretation of this planning during assembly of OV-104, "Atlantis," which Convair delivered just over a year ago.

McCaskey, an operations lead employee, and Birse, a lead inspector, were honored for their contributions to OV-104, while Dunbar was cited for machining parts for the midfuselage on various numerical control machines with uniformly excellent results.



Colonel Stewart and Snoopy Pin



## Canaveral Sites Named Historic U.S. Landmarks

By Charles Brown

Three abandoned launch sites at Cape Canaveral, Fla., that have a special meaning for many General Dynamics employees have been named National Historic Landmarks by the U.S. Department of the Interior.

Launch Complex 13, Launch Complex 14 and the old Mercury Mission Control building were among eight sites at the Cape so designated this spring. Complex 13 was the origination point for a number of Atlas/Agena launches of deep space probes, Complex 14 was the launch site for the Atlas/Mercury flights — the nation's first manned journeys into space — and the Mercury Mission Control building housed the engineers and controllers for all of the Mercury flights of the original astronauts.

Complex 14 and the Mission Control building are considered the birthplace of the United States' manned space program. Conceived in 1958, the Mercury program suc-

cessfully completed its basic objectives in only three and a half years, with the three-orbit flight of John Glenn on February 20, 1962. A little more than a year later, Project Mercury made its final flight when Gordon Cooper completed 22 earth orbits in a 34-hour flight that started on May 16, 1963.

During that four and one-half years, more than two million people, including many from Convair, contributed to the six manned Mercury flights. The first 52 of the nearly 30,000 hours that U.S. astronauts have spent in space were logged on Mercury flights, sent into space by Convair's Atlas booster.

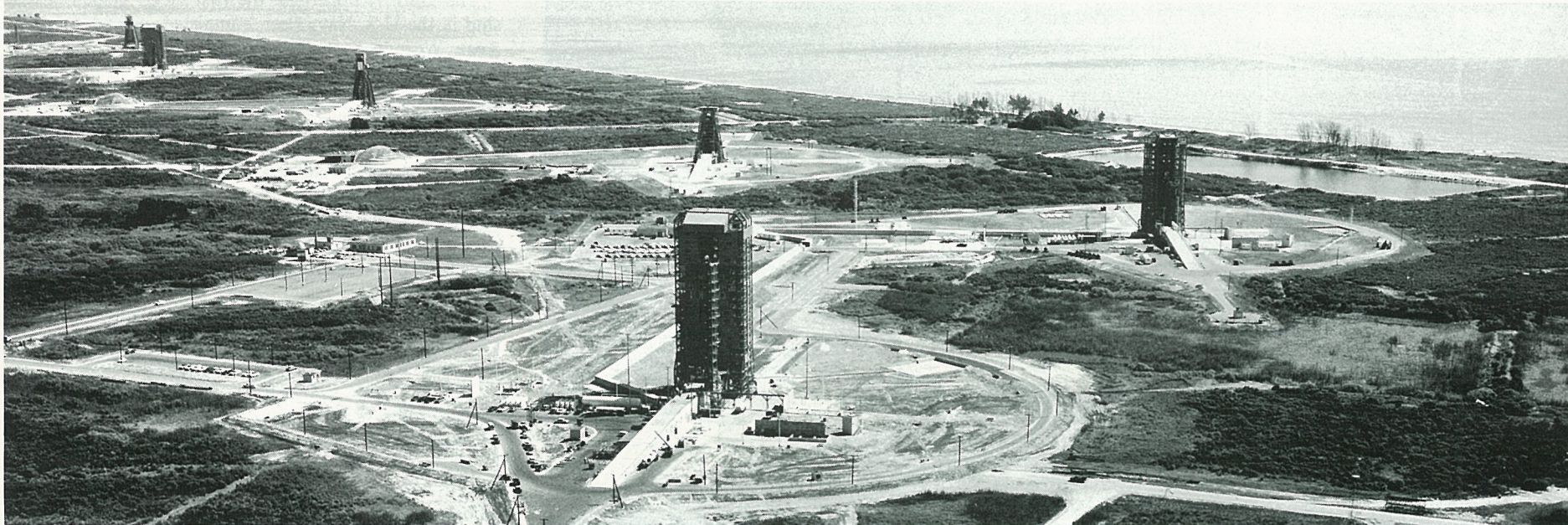
Since those early years, many milestones in the conquest of space have been met and passed. The Space Shuttle, whose midfuselage section was built by Convair, now regularly takes astronauts and satellites into low orbit.

Interplanetary probes, launched by Convair's Atlas/Centaur and Titan/Centaur, have sent us unprecedented pictures of Venus, Saturn, Mars, Jupiter and beyond. In 1986, Convair's Centaur G-Prime will launch probes of Jupiter and the sun from the Shuttle. Space stations, both manned and unmanned, are on the drawing boards.

The historic nature of the Mercury program was recognized in 1964 when a special monument was erected to honor the men and women who were involved in the program.

Dr. Edward Welsh, then Executive Secretary of the National Aeronautics and Space Council, said at the dedication ceremony that "Mercury set the pattern for the expeditious, yet careful manned exploration of space."

That pattern has continued through Gemini, the Apollo missions to the moon and the Space Shuttle.



**National Landmarks.** This 1964 photo shows Launch Complexes 36B (foreground) and 36A (at right) as well as Complexes 12, 13 and 14 (from left to right, background). Complexes 13 and 14, now abandoned, have been designated as National Historic Landmarks by the U.S. Department of the Interior. Complexes 36A and B are still active today as the launch sites for Atlas/Centaur missions. Also named a national landmark was the old Mercury Mission Control building.



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August 1984

## Advanced F-16C Draws Superlatives In Delivery Ceremony at Fort Worth

The first F-16C Falcon was formally delivered to the U.S. Air Force July 19th in a ceremony that was filled with high praise about the advanced version of the operationally proven aircraft.

Lt. Gen. Robert E. Kelley, Vice Commander of the Tactical Air Command and main speaker at the ceremony, said that the F-16A "has that enviable reputation as the most maneuverable fighter in the world. The basic design of the F-16 has been proven."

Referring to differences between the F-16A and F-16C, General Kelley said, "In today's world, with numerous competing priorities, we must product-improve if we are to maintain our qualitative edge and at the same time be one step ahead of the enemy."

General Kelley, who has logged more than 4,000 hours in military aircraft, said, "Pilots across the world know that the F-16 is a dream to fly. What is not as well known is that the F-16 is held in the same high esteem by the people who maintain it."

"It is evident," General Kelley said, "that the F-16A has met or exceeded our expectations, and it continues to respond to the challenge of the '80s. I want you to know that I speak for everyone in the TAF (Tactical Air Force) when I say that we are extremely pleased and delighted with the F-16. It's the most sought-after fighter in the Free World."

(The full text of General Kelley's speech begins in the column at far right.)

"This achievement brings to my mind the great manufacturing innovativeness that this company and you (Fort Worth employees) have come to represent. In 1979, F-16 aircraft No. 11 took a respectable 110,000 man-hours to produce. The impressive fact is that now it takes you only 29,000 man-hours . . . Our learning curve is still on a phenomenally steep 86 percent slope after 1,200 aircraft! This has taken an individually superb performance from each person on the Fort Worth team."

Brig. Gen. Ronald W. Yates,  
F-16 System Program Director

"That airplane is a winner," said Lt. Gen. Thomas H. McMullen, Commander of the Air Force Systems Command, as he pointed to the single-seat aircraft on display during the ceremony.

"In fact," he said, "like its predecessor, the F-16A — which was demonstrated a winner in tests, then in training and finally in actual combat — this airplane is well on the road to proving itself a winner in flight test."

"The F-16 program clearly has been one of superlatives with dramatic new solutions to long-standing problems. The notion of a high-g cockpit, the fly-by-wire capability, the blended body design and on and on . . . the F-16 has been a benchmark in modern aviation combat capability."

General McMullen, who has logged more than 7,000 hours as a military pilot, said, "For the first time, the F-16 has really made man the limiting factor, instead of the machine, in air-to-air combat."



**Pilot's View.** Lt. Gen. Thomas McMullen, Commander of the Air Force Systems Command, sits in the cockpit of the F-16C Falcon while Test Pilot Kevin Dwyer points out the new features of the aircraft.

"The Fighting Falcon program is the largest defense program in U.S. history, and it has become an important element in the arsenals of the defenders of western civilization around the world."

"This superb aircraft is not only flying for the United States and four of our allies in Europe, but it has now spread its wings to four other countries around the world, and two others are eagerly awaiting the reception of their first Falcons."

"So, as we stand here and accept this first F-16C airplane, we are really writing the next chapter in the Falcon legacy. We people who are here today — the designers and builders from industry, the management team and operators from the Air Force and, of course, the providers of resources that come from the other parts of the government — have forged yet another important element in the arsenal of the Free World."

In earlier remarks, David S. Lewis, Chairman and Chief Executive Officer of General Dynamics, called the delivery "another major milestone in the dynamic and evolutionary F-16 program. Our company is committed to continuing the evolutionary improvement of this program."

Herbert F. Rogers, Vice President and Fort Worth General Manager, said that the first F-16C "is being delivered in what we hope is the F-16 tradition: On time, completely within budget, a high product quality, and from a hardware point of view, actually ahead of schedule."

At the close of the ceremony, another F-16C and an F-16D two-place trainer were also displayed and Chief Test Pilot Dave Palmer flew an air show, demonstrating the F-16's flight and handling qualities.

## F-16C Delivery

# General Kelley Lauds F-16 Falcon In Keynote Speech

Lt. Gen. Robert E. Kelley, Vice Commander of the Tactical Air Command, said at the delivery ceremony of the F-16C Falcon that fighter pilots throughout the world are eagerly awaiting the F-16C because of its improved capabilities.

These improvements, he said, are vital to meeting a rapidly improving threat.

The full text of General Kelley's remarks follow:

I'm very pleased to be here in Fort Worth. It is a great personal pleasure for me to represent the Tactical Air Forces — TAC, USAF and PACAF — at the rollout of the first F-16C.

My pleasure is multiplied and exceeded only by those great hard-working fighter people around the world that are eagerly awaiting the F-16C and its improved capabilities which we all know are vitally needed if we are to stay that important step ahead of a rapidly improving threat.

As we look at the F-16C, it is interesting to note that its external appearance is very little different from the original YF-16 that first flew more than 10 years ago. Yet the difference in combat capability is monumental. I think it might be useful to reflect on how the F-16 has changed over the years and how well those changes have served us.

There are many ways to consider change. Generally we tend to view technological change as either revolutionary or evolutionary. The first heavier-than-air flight at Kitty Hawk was revolutionary, a dramatic break from the past. It changed the size and shape of our world in irreversible ways. In a much narrower context the F-16 design was a revolutionary change. The design of its aerodynamics and flight controls embodied bold advancements that thrust us far ahead of our adversaries and earned for the F-16 the enviable reputation of the most maneuverable fighter in the world.

However, as significant as these advancements were, to me the most revolutionary aspect of the F-16 was not the design but the concept. The F-16 completely turned around the way we went about building new fighters. I think most present here today know what I mean. From the F-86 to the F-15 — the criteria for performance was higher, faster, farther. Better combat capability meant more sophistication to the point that the fighter we asked industry for had to provide air superiority, air defense, close air support of the ground troops and interdiction 24 hours a day in all kinds of weather. Mission impossible.

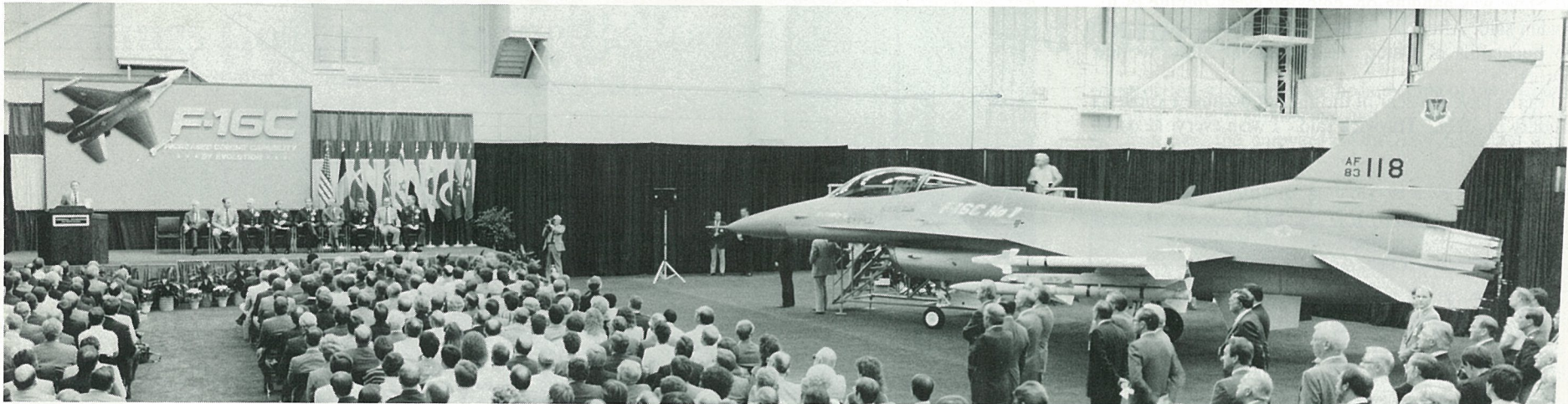
To accommodate these requirements and gain more combat capability, fighter aircraft became larger, heavier, more complex and more expensive. But the F-16 changed all that. More importantly, it changed the perception that larger, heavier and more complex aircraft were the prerequisites of more capability.

Harry Hillaker and his design team here at General Dynamics proved that there was a better way — that

(Continued on Page 3)



General Kelley



**Delivery Ceremony.** The first F-16C Falcon sits on display during the delivery ceremony at Fort Worth July 19th. U.S. Air Force and General Dynamics officials had high praise for the advanced Falcon as it was officially turned over to the USAF. On the speakers' platform, from left to right, are: Herbert F. Rogers, Vice President and Fort Worth General Manager (at podium); David S. Lewis, Chairman and Chief Executive Officer of General Dynamics; Dr. Tom Cooper, Deputy Secretary of the Air Force for Research, Development and Logistics; Lt. Gen. Thomas McMullen, Commander of the Air Force Systems Command; Lt. Gen. Jack Gregory, Commander of the 12th Air Force; Lt. Gen. Robert E. Kelley, Vice Commander of the Tactical Air Command; Richard E. Adams, Executive Vice President-Aerospace; Brig. Gen. Ronald W. Yates, F-16 Systems Program Director; Dr. Ted S. Webb, Vice President-F-16 Programs, and Col. Bruce Williams, Commander of the Air Force Plant Representative Office.



# Angermeier Appointed Corporate Director Of Labor Relations

Rudolph A. Angermeier has been named Corporate Director-Labor Relations at Corporate Headquarters. He will report to George J. Chopp, Staff Vice President-Labor Relations.



Angermeier

Angermeier, 54, formerly was Director of Labor Relations at Land Systems. A native of Mount Clemens, Mich., he served in the U.S. Marine Corps from 1948 to 1952 and joined Chrysler Defense, Inc., as labor relations supervisor in 1953. He later held the positions of Personnel Manager and Division Labor Relations Manager.

## Savings and Stock Investment Values

Salaried	June 1982	June 1983	June 1984
Government Bonds	\$ 2.9708	\$ 3.5030	\$ 3.7263
Diversified Portfolio	1.9021	3.3103	2.9086
Fixed Income	1.3531	1.5146	1.7006
Hourly			
Government Bonds	2.9679	3.5012	3.7245
Diversified Portfolio	1.9413	3.3815	2.9552
GD Stock	\$28.0000	\$54.0000	\$52.5000

# Savings Bond Booster At Fort Worth Wins Ride in F-16

Steve Traywick, a numerical control machinist on Fort Worth's second shift, recently became the envy of many at the plant when he won the grand prize — an F-16 flight — in a drawing promoting the division's 1984 U.S. Savings Bond Campaign.



Traywick

His 42 minutes aloft were doubly exciting for him because they not only fulfilled his dream of flying in the fighter he helps build, but they also marked his first time up in an aircraft of any type.

Traywick said he thought he had little chance of winning when he signed up to buy U.S. Savings Bonds. He said the flight was a fantastic bonus because the bonds "are such a good way to save" without any added inducements. Test pilot Joe Bill Dryden gave him a preflight briefing and served as the front-cockpit "instructor pilot" for the flight, which was made in the two-seat F-16/79 model of the Falcon. Dryden demonstrated a number of maneuvers, including rolls, rapid turns and a maximum power, vertical takeoff. "We were flying the airplane fairly aggressively, and Steve was hanging on, enjoying every minute of it," Dryden said. After the flight, Traywick was doused with two bucketfuls of water, the traditional salute to new aviators.

"I didn't have any fear of the aircraft because I know it's a quality product," Traywick said. "I wish everyone could fly in it."



**Providence christened.** Mrs. Jean W. Smith, wife of U.S. Attorney General William French Smith, swings a bottle of champagne toward the striking bar on the bow of the attack submarine *Providence*. Looking on are (left to right): David S. Lewis, Chairman and Chief Executive Officer of General Dynamics; Merry Vaughan Dunn, Mrs. Smith's daughter and matron of honor, and Attorney General Smith, who was the principal speaker at the ship's christening.

# Providence Called "Keeper of Peace" In Christening at Electric Boat

Because she is designed for defensive purposes, the fast-attack submarine *Providence* is a keeper of the peace and a surety of freedom throughout the Free World.

This was the central theme of U.S. Attorney General William French Smith, the principal speaker at the christening of the *Providence* (SSN 719) August 4th at Electric Boat's Groton, Conn., shipyard.

The Attorney General's wife, Jean Smith, was the sponsor for the boat, the 19th of her class to be built at Electric Boat and the first submarine to be named for the capital city of Rhode Island.

The Attorney General told more than 8,000 spectators that "The *Providence* represents a reassertion of American power. It represents the determination of the American people to achieve peace through strength. There is no other way."

He called the launching "one more sign of the recent change in our nation's course. The *Providence* is a sign of our military renewal and commitment, a sign that we Americans realize that peace must be achieved and maintained through sufficient military strength."

Smith explained that the *Providence* is the first ship of her class designed to fire the Tomahawk cruise missile from vertical launch tubes. "This is truly an awesome weapons system," he said. "But let us bear in mind that this ship is designed not for offensive but defensive purposes. This submarine is a keeper of the peace, a surety of liberty for Americans and indeed for men and women throughout the Free World."

The spectators gave a warm greeting to *Providence* as she glided out of the huge North Yard construction shed into the Thames River. Most of them were unaware that the sponsor, Jean Smith, wife of the U.S. Attorney General, had failed to break the champagne bottle on the bow after three attempts.

But the problem was easily rectified. Norman McIntyre, Electric Boat's Manager of Ships' Management, is sta-

tioned on the bow of every ship launched for just such a possibility. Receiving a signal from John Robak, a spotter high in the crane ways above the ship, McIntyre smashed a backup bottle on *Providence* as she gathered speed down the ways.

In his opening remarks, Fritz Tovar, Electric Boat Vice President-General Manager, recognized "the outstanding contribution the men and women of Rhode Island have made to our national defense." Tovar was referring to the 5,500 Ocean State employees at the company's Quonset Point, R.I., facility and the 3,200 who work at the Groton shipyard.

"They, together with their colleagues from Connecticut and neighboring states," Tovar said, "are dedicated to building the finest submarines in the world and have worked together for many months to produce this fine ship we launch today."

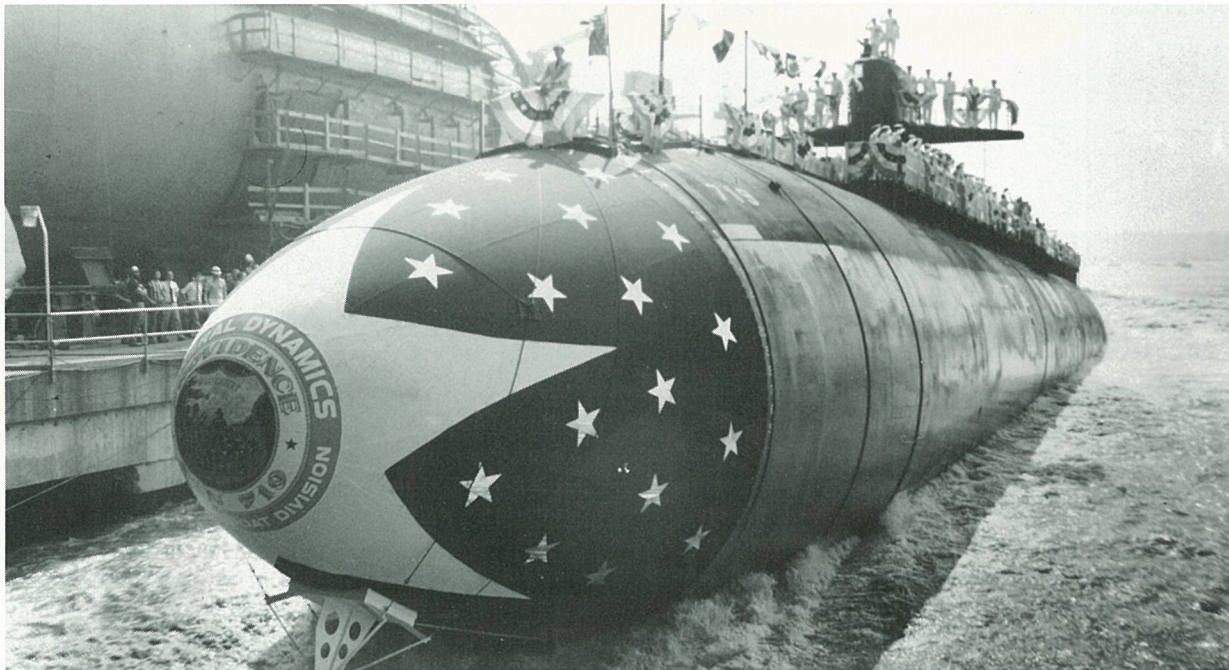
David S. Lewis, General Dynamics' Chairman and Chief Executive Officer, referred to division employees gathered at the launching as representing "the heart of Electric Boat, the finest builders of submarines in the Free World."

Providence Mayor Joseph Paolini, Jr., elected only four days earlier in a close race, quipped, "I almost didn't make it here today. I'm happy that the citizens of Providence chose me, and I'm honored to take part in this ceremony."

Mayor Paolino said the 360-foot, 6,900-ton ship is "symbolic of the long-standing role of the city and the state in protecting freedom."

Other dignitaries participating in the ceremony included Walter Skallerup, General Counsel of the Navy, who introduced Smith.

The launching was the third this year at the shipyard. *Augusta* (SSN 710), a sister ship of *Providence*, slid down the ways January 21st and *Alabama* (SSBN 731), the sixth Trident missile-firing submarine, was christened May 19th. *Providence* is scheduled for delivery to the Navy in 1985.



*Providence* Slides into the Thames River

GENERAL DYNAMICS

# World

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# General Kelley Says Fighter Pilots Are Eager for F-16C

(Continued from Page 1)

technology could alter both the vector and the velocity of change. They proved that bigger was not necessarily better.

In my opinion, the F-16A arrived on the scene none too soon. The first question put to me 11 years ago when I became Chief of Fighter Force Plans in the Air Staff was this: What should our mix of aircraft be if our force structure were cut from 22 to 18 fighter wings? Our small office of seven officers set out to answer that question and finished by building the case for 26 active tactical fighter wings.

I smile a little inside every time I think about the balance and mix of weapon systems in our current fighter force as compared with that of 10 years ago — really, there's no comparison. Our current fighters are superior in every way. And I am happy to report finally, we have reached 26 TAC fighter wings in the Active Force and an additional 10 in the Air Reserve forces that we were looking for in 1974. But what is more important, nearly every squadron has been modernized with a significantly improved weapon system, and that means greater combat capability — and the Soviets know it. When we give well-trained and motivated fighter pilots good equipment, we get readiness and combat effectiveness — and that's the name of the game. All this would not have been possible without the F-16 — it was the key to a major change in our tactical fighter forces.

**"In my opinion, the F-16A arrived on the scene none too soon."**

Many questioned the idea that the requisite operational characteristics of speed, range, firepower and maneuverability could all be packed in a small and relatively inexpensive airframe. But the F-16 silenced the skeptics and has amply demonstrated in its short history that the General Dynamics way was, in fact, a better way.

For example, in 1981 during the Royal Air Force bombing competition in England, the F-16 team from the 388th Wing at Hill AFB accumulated 88 simulated kills against adversary aircraft while suffering only one loss. This feat was accomplished en route to winning this air-to-ground competition with the only perfect bomb score and highest total point count ever recorded in the history of the meet.

In actual combat, the F-16 has proven that it was not a system for exercises and weapon competitions only. The specifics of the Israeli action in the Bekka Valley in 1982 are classified, but it is well known that the F-16 contributed significantly to the overall 86 to 0 air-to-air kill ratio. The Israelis will tell you in no uncertain terms that U.S. equipment is the difference.

More recently in 1983, the F-16 proved its air-to-ground prowess by placing first, second and fourth in Gunsmoke — the Air Force worldwide bombing competition. And, of course, we all know that the F-16 is proudly flown by the Air Force's Precision Aerial Demonstration Team — the Thunderbirds. By the way, the Thunderbird team has just returned from a very successful trip through Europe and North Africa performing for more than 2,000,000 people.

In addition to these successes, the F-16 has proven itself in numerous other ways. The most noteworthy is in posting very high standards of maintainability, reliability and supportability. As you know, these factors combine to increase availability, and that translates directly to increased readiness and more defense and more security from each defense dollar. Pilots all know it is a dream to fly, but the F-16 is held in the same high esteem by those who maintain her — they love it!

Finally, the F-16 has set the standard for airworthiness and safety. It has the best record of any single-engine fighter in Air Force history, and this safety record continues to improve. Last year the Air Force had its safest flying year ever. The F-16's mishap rate was a major factor contributing to this record with its safest flying year.

From this brief recount, it is evident that the F-16A has met or exceeded our expectations and continues to respond to the challenge of the eighties. It came at a much needed time as we modernized our fighter fleet and, more importantly, because of its low cost, we were able to make needed gains in force structure. It has filled the Air Force requirement for an aircraft capable of performing the "swing" role and thereby providing air commanders the ability to exploit the flexibility of airpower. It has the capability to establish air superiority, complement the A-10 in close air support or take the fight to the enemy in his own backyard attacking second echelon targets. Speed, range, maneuverability, accurate firepower, survivability — the F-16 has it all.

Today, the F-16 represents some 25 percent of our fighter force inventory and, counting our allies, we have fielded over 1,200 aircraft. I know I speak for everyone in the TAF when I say we are delighted with the F-16. It's the most sought after fighter in the Free World, and I congratulate the original General Dynamics engineering and management team that made it happen. So, why change a winner?

If the F-16A is so good, why go to the trouble and expense of changing it? Some might use the phrase, "If it ain't broke, don't fix it!" Unfortunately, the threat is not standing still. Our potential adversaries continue a massive modernization program. Their tactical forces have far outweighed ours for years and they are now closing the gap in fielded technologies, including the ability to operate beyond visual range, at night and in adverse weather conditions.

Thus we come to the reason for being here today. The F-16 design concept has been proven. But in today's world with numerous competing priorities, we must "product improve" if we are to maintain our qualitative advantage and remain that step ahead of the threat. At the same time we must hold down cost if we are to meet our force structure goals. Therefore, we now turn from revolutionary change to evolutionary change.

As a type of change, evolution may be thought of as "a process of change in a certain area or direction." The F-16C is a good example of such change. The F-16A was aerodynamic change; the F-16C avionics. As you look at the aircraft, there are no substantial changes in appearance — more supportive of the idiom that the more things change, the more they remain the same. However, often things are not what they appear. I can assure you that the F-16C represents an evolution from the best swing fighter in the world to the best night and all-weather swing fighter in the world.

There is no question in the operator's mind about the F-16C; we are anxiously looking forward to its arrival because of the added combat capability it gives us. In terms of navigation, the F-16C will be able to accommodate the global positioning system — a navigation grid provided by satellites which will allow the F-16 to precisely navigate anywhere in the world. In addition, this system will provide improved accuracies for standoff weapon deliveries.

In terms of survivability, the F-16 has more sophisticated electronic warfare systems to detect and jam electronic emissions. The improved radar warning receiver has been planned to cover the electronic threat well into the next century. The technology embodied in the self-protection

jamming system represents a dramatic step forward for our tactical forces, but it pays off in other ways, too. By allowing us to carry this equipment internally, we increase our range, payload and operational flexibility.

The F-16C has two key areas of improvement which will allow us to expand our air-to-air capabilities. First, the new APG-68 radar with its multitrack, multishot capability. Tied closely but not totally to the radar will be the aircraft's ability to carry and employ AMRAAM, the advanced medium range air-to-air missile. This missile and radar combination will move the F-16 into the 24-hour-a-day, all-weather fighter environment, while retaining its superiority in the close-in, dogfight arena. Operationally, we estimate these improvements will increase our air superiority effectiveness six-fold.

While these improvements are impressive, the single most important system incorporated in the F-16C is the low altitude navigation and targeting infrared system for night — or LANTIRN, for short. As we watch a threat that is placing more and more emphasis on night-fighting capabilities for its ground forces, it becomes apparent that we cannot allow the enemy the sanctuary of night to conduct offensive operations against us. The LANTIRN system will finally turn night into the equivalent of day for our pilots. With automatic terrain following at very low altitude and the ability to see in the night world and use our day weapon delivery tactics and techniques, we will have a force multiplier that really counts! For example, it will increase our operational employment window by 375 percent. We cannot overstate the need for LANTIRN nor our excitement about the force effectiveness improvement it promises.

These are but a few of the improvements being incorporated into the F-16C. Many other equally important refinements have been made to increase the supportability and maintainability of this aircraft. In the case of the engines, the automatic trimming system will eliminate numerous maintenance hours and downtime — the end result is more aircraft available and, therefore, increased force readiness.

Integrating all of these systems into one aircraft, and I'll say it without any reservation — a beautiful aircraft — has been no easy task. The software challenge alone has taught us a most valuable lesson. We used to think and say — "Oh, it's only a software change" — conjuring up ill-conceived thoughts that software, unlike hardware, could be accomplished overnight. We all now know that this is untrue and, in fact, hardware and software development times have reached the point where they are equal.

**"As Americans, we can all be proud that we are producing and flying the world's finest fighter aircraft."**

As I said in the beginning, the F-16 program represents change. First revolutionary and now evolutionary. But either way it doesn't matter to the crew chief on the flight line or to the fighter pilot in the cockpit as long as the system is available and works as advertised. The brief history of F-16A has been tremendous and we anticipate even better results with F-16C.

Speaking for TAC and the entire Tactical Air Forces, I would like to thank all those in our Federal Government, the Air Staff, Air Force Systems Command, General Dynamics and all the subcontractors and associate contractors who have labored so hard to bring this newest Fighting Falcon into being. As Americans, we can all be proud that we are producing and flying the world's finest fighter aircraft.

## Earnings Continue Strong Performance in Second Quarter

General Dynamics announced August 2nd that its net earnings for the second quarter and first six months of 1984 were \$96.0 million, or \$1.97 per share, and \$173.5 million, or \$3.49 per share, respectively, both records for any three-month and six-month period in the company's history.

The earnings for the comparable periods of 1983 were \$72.7 million, or \$1.32 per share, and \$129.5 million, or \$2.35 per share. The 1984 per share earnings are based on an average number of shares outstanding of 48.3 million for the second quarter and 49.7 million for the first six months compared to 54.6 million for both 1983 periods, reflecting the company's stock repurchase program.

Sales were \$1.9 billion for the second quarter and \$3.8 billion for the first half of 1984, compared to \$1.8 billion and \$3.6 billion a year earlier. Funded backlog at the end of the 1984 second quarter was \$15.0 billion and funded and unfunded backlog totaled \$17.4 billion.

David S. Lewis, Chairman and Chief Executive Officer,

said, "These results reflect the strong performance of the company's aerospace and marine groups, with steadily improving support from the commercial operations."

Recent highlights in the aerospace group included:

- Delivery of the first F-16C to the U.S. Air Force. This advanced version of the F-16 Falcon incorporates a new radar and advanced avionics systems enabling it to utilize new weapons and to operate in adverse weather conditions.
- A number of successful flights of the Convair Tomahawk cruise missile, including two follow-on test and evaluation flights of the Air Force ground-launched version and a successful demonstration of the sea-attack capabilities of the Navy's sea-launched missile.
- Installation of Pomona's Phalanx aboard the USS *Rentz*, the 100th U.S. Navy combatant ship to be armed with this ship-defense system.

Electric Boat continued to meet or better submarine

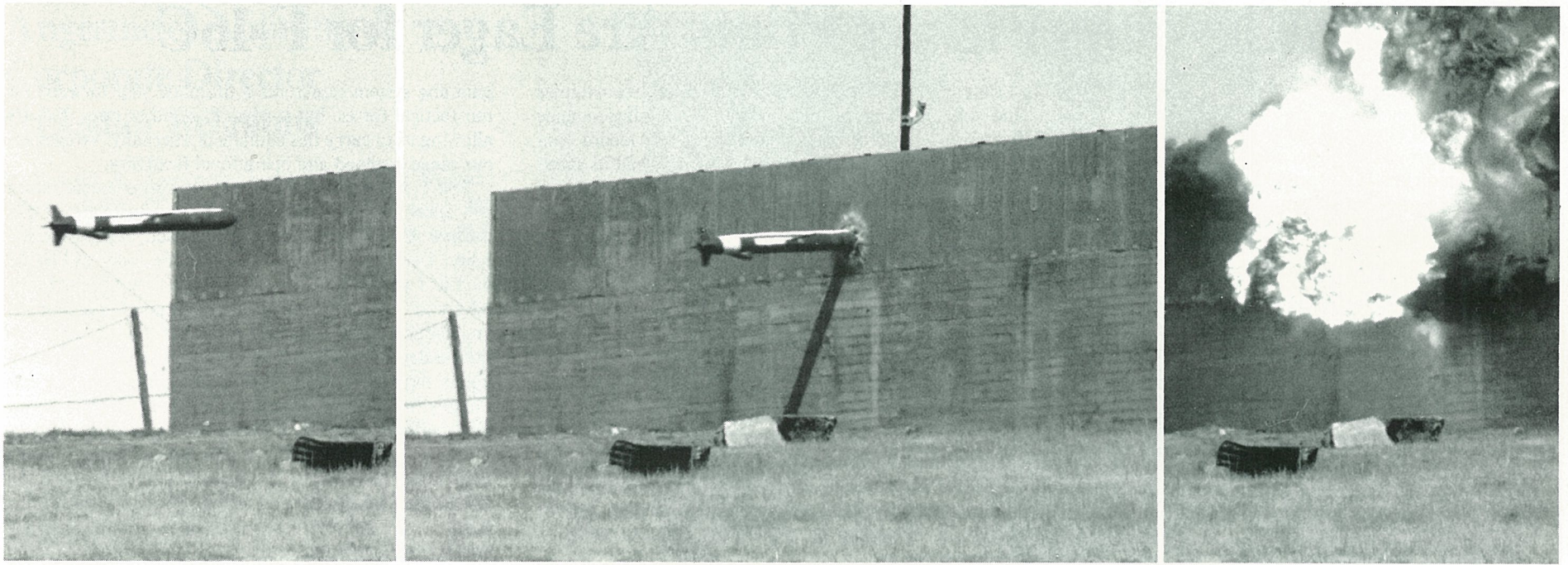
construction schedules with the launching of the *Alabama*, the sixth Trident submarine, and delivery of the *Hyman G. Rickover*, the shipyard's 17th SSN 688-class attack submarine.

"The large capital investments we have made in recent years at Electric Boat are clearly resulting in improved quality and efficiency," Lewis said.

Quincy Shipbuilding continued to make good progress on the five Maritime Prepositioning Ships being built for the U.S. Navy Military Sealift Command, Lewis said, with delivery of the first scheduled for early next year.

In the commercial area, the company's resources group turned in a solid performance over both periods, according to Lewis. Overall sales and earnings for the Chicago-based coal, lime and construction materials operations were considerably better than a year earlier. Datagraphix, the industry leader in computer output microfilm, also showed a marked increase in sales and earnings.





**Accurate Attack.** A U.S. Navy/General Dynamics Tomahawk cruise missile attacked a land target with a live conventional warhead for the first time in a test conducted last month at the Pacific Missile Test Center's Sea Test Range. Launched from a submerged submarine, the Tomahawk flew a land-attack mission over the range, making several passes over San Clemente Island located off the Southern California coast. After the navigation portion of the mission was completed, the missile hit its target, a concrete structure on the island.

## Convair's Tomahawk Cruise Missile Showing Its Mission Versatility

A long series of tests and operational evaluation of the Convair-built Tomahawk has been proving the cruise missile's versatility for a variety of missions.

Both the Tomahawk Antiship Missile (TASM) and the nuclear version of the Tomahawk Land Attack Missile (TLAM-N) have completed operational evaluation by the U.S. Navy, and both have been certified for operational use aboard surface ships and submarines. Last December, the Ground Launched Cruise Missile (GLCM), another Tomahawk variant, reached its Initial Operational Capability in England as a part of the NATO Theater Nuclear Force modernization program.

Flight testing of Tomahawk began in February 1976, and the 130 flight tests since then have been from launchers on land, in the air and at sea from both submarines and surface ships. The missile has demonstrated its ability to seek out, locate and attack targets at sea and to fly a precise preprogrammed course over many miles of varied terrain to hit land targets with pinpoint accuracy.

Since that first flight in 1976, Tomahawk has been considered for a number of roles. In recent testimony to the House Armed Services Committee, Rear Adm. Stephen J. Hostettler, Director of the Joint Cruise Missile Project, outlined how the Tomahawk cruise missile affects naval warfare.

"As an antiship missile," he said, "it extends the reach of Navy units to an operational range of more than 250 miles

from both submarines and surface ships . . . The conventionally armed land attack version both supplements and complements carrier-based aircraft, permitting a conventional attack on heavily defended targets where aircraft attrition would be unacceptably high."

Admiral Hostettler said that the nuclear land attack Tomahawk provides the Navy with an increased worldwide capability to deter nuclear warfare, as well as contributing to the nation's nuclear reserve force in a strategic role. The land-based version — GLCM — provides a mobile theater nuclear force offsetting the heavy Soviet deployment of medium range nuclear missiles in Europe.

With GLCM now being deployed to its second European base, at Comiso, Italy, and with both TASM and TLAM-N now certified for fleet use on submarines and ships, development work continues on the conventional land attack Tomahawk and on vertical launch systems for both submarines and ships.

Admiral Hostettler told Congress that attention is now being focused on upgrading the TLAM-C with a terminal dive mode of attack and with programmable warhead detonation. A multiple submunition version of the conventional land attack Tomahawk is also being developed.

Vertical launch testing will also continue in order to ready the missile system for the time when ships and submarines with that capability are added to the fleet in 1986.

Since 1983, production of operational missiles at Con-

vair has increased at a steady pace. From a low of four to six missiles a month last year, the rate increased to 10 to 12 a month, and last February that restriction on production rate was lifted by the Secretary of the Navy. Admiral Hostettler told Congress that the Navy plans to buy approximately 4,000 Tomahawks, of which 3,200 are to be conventionally armed. Another 560 GLCMs are planned for the Air Force.

In addition to the GLCMs being deployed to Europe, the Initial Fleet Capability for Tomahawk was reached on the USS *New Jersey* in March 1983 with both antiship and conventional land attack missiles. TASM was first deployed on submarines in November 1983 and will be deployed on other surface ships this summer. The nuclear land attack missile became operational aboard some Navy combatant ships last month.

The program, which began in 1972, has evolved into a family of weapons which multiplies the offensive force capabilities of the nation while at the same time complicating the planning of any potential adversary. As Admiral Hostettler reiterated to Congress:

"We have tested all the variants in the operational environment and we know that they will work, and work well. No other weapon in the world today can fly at the distance demonstrated by Tomahawk and strike targets with their degree of accuracy."

## Quonset Point Sets Component Records

Electric Boat's Quonset Point, R.I., facility logged two major firsts recently in large component moves.

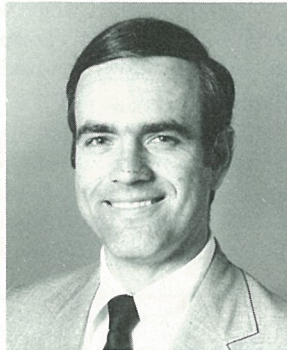
In one project, the facility shipped its largest 688-class fast-attack submarine component ever to the division's Groton, Conn., shipyard — a five-cylinder unit that tipped the scales at 600 tons. The previous record for a single 688-class component shipment was 350 tons.

In another record-setting effort, the facility turned five different Trident submarine components from vertical to horizontal positions. The components were made up of from three to five cylinders each. Each component weighed from 450 to more than 500 tons. Until the move, the largest Trident unit turned had weighed under 350 tons.

## E.R. Jayne Is Appointed Staff VP-Planning

E. R. Jayne II has been named Staff Vice President-Corporate Planning at General Dynamics. Jayne, who has been Corporate Director of Aerospace Planning and Operations Analysis since July 1980, succeeds Asaph H. Hall, who recently became Vice President and General Manager of Data Systems.

From May 1977 until he joined General Dynamics, Jayne was Associate Director for National Security and International Affairs



Jayne

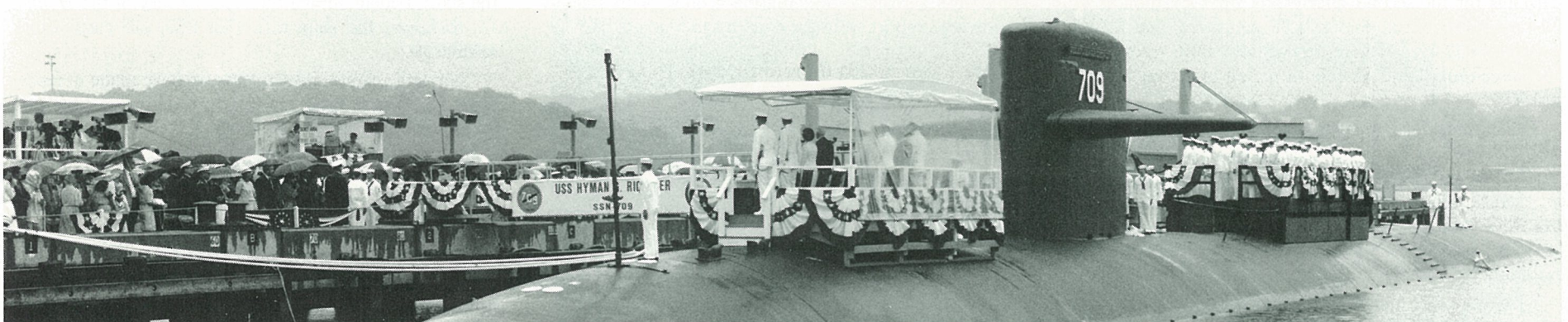
with the Office of Management and Budget (OMB) in the Executive Office of the President.

From March 1976 to April 1977, he was a National Security Council staff member, Defense Program Analysis.

Jayne received a Bachelor of Science degree in International Relations from the United States Air Force Academy in 1966.

He also received a doctorate in Political Science/National Security Affairs from the Massachusetts Institute of Technology in 1969.

He subsequently served in the Air Force until April 1977, receiving a number of military awards and decorations, including the Silver Star with an Oak Leaf Cluster and the Distinguished Flying Cross.



**Rickover Joins Fleet.** Under a sea of umbrellas, spectators watch the commissioning ceremonies for the USS *Hyman G. Rickover* (SSN 709) at the U.S. Naval Submarine Base in Groton, Conn., July 21st. The Electric Boat-built submarine was delivered to the Navy July 16th, 55 days ahead of schedule. U.S. Rep. Charles Bennett of Florida, Chairman of the House Seapower Subcommittee and principal speaker at the commissioning, called the admiral for whom the ship is named "a truly remarkable American." The *Rickover* was launched on Aug. 27, 1983. She is the 17th ship of her class built by Electric Boat, which has nine other fast-attack submarines under construction.

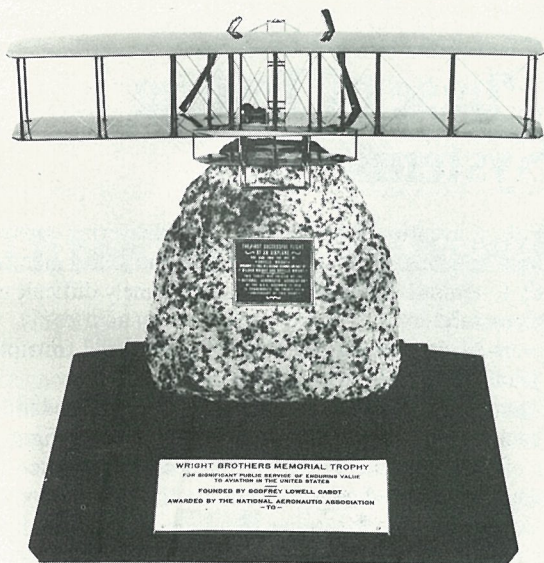


# Chairman D. S. Lewis Will Receive 1984 Wright Bros. Trophy

David S. Lewis, Chairman and Chief Executive Officer of General Dynamics, has been named the recipient of the prestigious Wright Brothers Memorial Trophy for 1984.

The announcement was made recently in Washington, D.C., by the National Aeronautic Association (NAA), which has administered the award for the past 36 years. The NAA is the oldest independent, nonprofit aerospace organization in the United States.

Presentation of the trophy, a silver model of the original Wright Brothers airplane, will be made on December 7th at the annual Wright Brothers Memorial Dinner, hosted by the Aero Club of Washington.



## The Wright Brothers Memorial Trophy

In naming Lewis the 1984 award winner, the NAA recognized his contributions to aviation as a top executive for General Dynamics and the McDonnell Douglas Corporation. The association said Lewis has been instrumental in giving the U.S. and its allies outstanding combat aircraft, including the F-4 Phantom and the F-16 Falcon.

Lewis, an engineer by training, rose through the ranks to become the President and Chief Operating Officer of the McDonnell Douglas Corporation. He joined General Dynamics as Chairman and Chief Executive Officer in October of 1970.

The citation accompanying the award reads: "The Wright Brothers Memorial Trophy is awarded to David S. Lewis for his lifetime contributions to military aviation and national defense and his untiring efforts in the design, development and production of superior combat aircraft."

The award was first given following the death of Orville Wright in January 1948. The Aero Club of Washington, a chapter of the NAA, conceived the idea of establishing a suitable award to honor the memory of both Orville and Wilbur Wright. The trophy is awarded annually for "significant public service of enduring value to aviation in the United States."

The list of past recipients is an honor roll of famed aviators and supporters of aviation in the U.S. The list includes Charles A. Lindbergh, Lt. Gen. James H. Doolittle, Sen. Barry M. Goldwater, Clarence L. "Kelly" Johnson, Dr. Theodore von Karman, Donald W. Douglas, Sr., Igor I. Sikorsky, William M. Allen, Juan Terry Trippe and other distinguished aviation pacesetters.

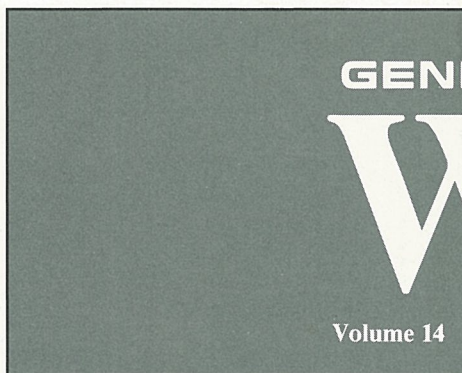
This is the second major aerospace-related award that Lewis has received. In 1975, Lewis and the U.S. Air Force/Industry team which produced the F-16 were awarded the Robert J. Collier Trophy, which also is administered by the National Aeronautic Association.

# Henry M. Jackson Delivered Early

The nation's fifth Ohio-class Trident ballistic missile-firing submarine, *Henry M. Jackson* (SSBN 730), was delivered to the Navy September 11th by Electric Boat 50 days ahead of contract schedule.

The 560-foot, 18,750-ton submarine is the ninth ship in a row that Electric Boat has delivered early.

*Henry M. Jackson* is scheduled to formally join the fleet during commissioning ceremonies October 6th at the Naval Underwater Systems Center in New London, Conn.



## Companywide Effort

# Quality and Productivity Improvement Programs Emphasizing Team Approach

Teamed with 12 other companies, General Dynamics is participating in a research project to determine how to increase the effectiveness and productivity of its office and support operations.

Called the Support, Technical and Office Performance Improvement Program, the study has been organized by the not-for-profit American Productivity Center in Houston, Tex. It is a two-year study of methods of improving productivity of nonproduction line functions.

"Increasing our productivity is very important to our nation," said Oliver C. Boileau, President of General Dynamics. "When we look at what has happened in past years to some entire industries in this country, it is easy to recognize that ignoring productivity improvement can be fatal."

"Other countries have placed a great emphasis on improving their industrial productivity — cost of producing goods and services — and as a nation our productivity growth fell behind that of other countries. The result has been very hard on some of our basic industries which have been hit by effective, competitive and high-quality products from overseas," Boileau said.

"If General Dynamics' future is to be a bright one, we must work as hard as we can to improve our productivity," he said.

"If we are successful, it will mean that our products will be competitive, with high quality built into them; we will be in a good position to compete successfully, and our employees will continue to have secure jobs," Boileau said.

The Support, Technical and Office Performance Improvement Program is the latest in a series of initiatives General Dynamics has undertaken in recent years to address the problem of increasing its productivity. The entire defense industry was challenged in 1981 by the then Deputy Secretary of Defense Frank C. Carlucci to make improvements in its productivity and to produce high-quality products.

The corporation's response has resulted in the Quality Improvement Process, or QIP, which addresses the challenges of improving productivity and quality at the same time: "When our quality is increased, when we reduce our scrap, rework and wasted effort, the productivity of our operations is automatically increased," said Dr. Alan M. Lovelace, Corporate Vice President-Productivity and Quality Assurance. "There is an old saying 'Work Smarter — Not Harder' and it certainly applies here. If we get everyone working on the problem of improving our quality, it will improve our productivity, and we will be producing higher quality products for less cost."

One major effort, the Engineering-Quality Improvement Process, or E-QIP, was begun at Pomona and is now being implemented by other divisions. Pomona's approach was to set up its own program, train engineering supervisors in productivity and quality and how to conduct seminars and then have them train their own engineers.

"We looked for some off-the-shelf method to do this," said Reginald G. Low, Pomona's Division Vice President and Program Director - Standard Missile Programs, "but we found nothing that met our needs. We set up our own program, and put our engineers through an initial 20 hours of off-site E-QIP training. Having our supervisors lead the training program has resulted in our receiving a real team effort in this — and that's what it takes. A lot of ideas have surfaced in our E-QIP program, and it has proven its worth."

Another program, the Production-Quality Improvement Process, or P-QIP, is examining methods of improving the corporation's manufacturing procedures. At Pomona, cost centers identify their Top 10 Problem Parts which cause excessive scrap and rework. A team is assigned to solve the problem and report on progress in a specified period of time.

(Continued on Page 4)

# Weight Lifting Record Set at Quincy

Quincy Shipbuilding's giant, 1,200-ton-capacity Goliath crane set a record for the heaviest lift in the United States by a single crane when it erected a 1,120-ton deckhouse for the lead Maritime Prepositioning Ship on August 18th.

"Never did I think we'd see the day when a 1,200-ton crane would almost not be enough," Gary S. Grimes, Division General Manager, said.

The lift, which took three hours by the 265-foot-high crane, was a team effort of Quincy riggers, shipfitters, welders, electricians, shipwrights, crane operators and quality assurance personnel. It began in the darkness before a picture postcard dawn, which made the event even more spectacular.

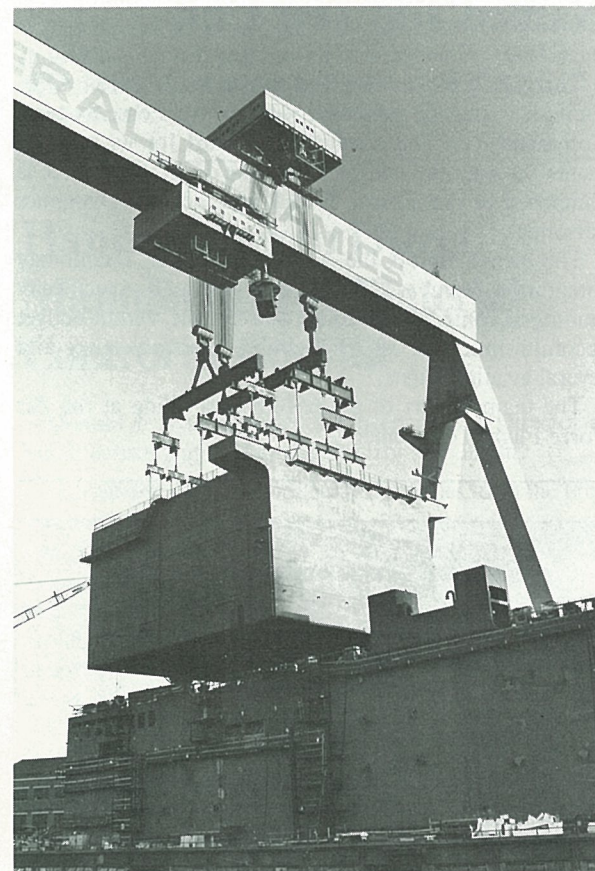
"This was a rewarding experience for all of us. It was an operation that succeeded due to the teamwork of all parties involved — from the trades, through engineering to management," said David Glickman, Rigging Superintendent.

One of the most crucial moments of the lift sequence took place the day before, when a test lift that taxed Goliath with a substantially heavier load was conducted to insure the four-legged crane was up to the feat. After the test lift, nine-year-old Goliath and its lifting gear were scrutinized for signs of stress. When it passed with flying colors, the deckhouse lift sequence went ahead.

The deckhouse, 97 feet by 80 feet by 50 feet, had been outfitted with interior bulkheads, piping and electrical systems in the basin adjacent to the *2nd Lt. John P. Bobo*, the first of Quincy's five MPS ships presently under construction. The deckhouse provides the living, dining and recreational spaces for the ship's 160-man crew and contingent of U.S. Marines.

The completion of the deckhouse erection keeps Quincy's MPS program flowing smoothly, on schedule and within budget. Mid-August found the MPS program's

lead vessel, the *Bobo*, 65 percent complete and set to be floated out this fall, while the entire fleet of five MPS vessels was 35 percent complete.



Quincy's Goliath Crane Makes Record Lift

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# Private Communication Network to Link GD Sites Coast to Coast

A private business communications network that will form the backbone of General Dynamics' future telecommunications system is being installed at six major company locations and will be fully operational in early 1985. The system, called an Integrated Services Digital Network, will use a satellite transponder to link earth stations at Groton, Detroit, Pomona, San Diego, Fort Worth and St. Louis. The St. Louis location will serve as the network control and management center, with back-up capability at Fort Worth.

Dale S. LeStourgeon, Corporate Manager-Telecommunications, who has been assigned overall management of the network project, said the new system will replace the majority of dedicated AT&T long lines now used for voice, data and electronic mail and will reduce the use of other long distance and WATS lines.

Following several years of planning and network studies, General Dynamics awarded a \$23 million contract to American Satellite Company (ASC). This contract covers the design, installation and operation of the system. LeStourgeon said that the company expects significant savings in private line and data circuit charges in the first five years of operation. This system will accommodate various General Dynamics telecommunications requirements which cannot be satisfied on the public network.

Implementation of the system has been a joint project of ASC and General Dynamics personnel. An earth station with antenna and transmitter/receiver shelter and digital switching equipment is being installed at each site.

LeStourgeon said that the network is capable of expansion "and should handle all our transmission needs for the next 10 to 15 years, including voice, data, facsimile, electronic mail and video conferencing. The network will be under General Dynamics' control and management. It will provide modern, efficient, high-speed, encrypted links between the stations and access to long-distance transmission off the network at reduced costs."

American Satellite Company, a partnership between Fairchild Industries and Continental Telecom, Inc., currently provides private line and private network communications services to more than 250 of the nation's largest businesses and government agencies.

## Savings and Stock Investment Values

Salaried	July 1982	July 1983	July 1984
Government Bonds	\$ 3.0351	\$ 3.4788	\$ 3.7715
Diversified Portfolio	1.8749	3.1727	2.9064
Fixed Income	1.3659	1.5295	1.7175
Hourly			
Government Bonds	3.0325	3.4768	3.7698
Diversified Portfolio	1.9129	3.2385	2.9520
GD Stock	\$29.5000	\$53.6250	\$53.0000

# Joint AFTI/F-16 Team Named Top Test Unit

The AFTI/F-16 Joint Test Force at Edwards AFB, Calif., was recently presented with the Air Force Systems Command Test and Evaluation Award for its achievements through the end of 1983. The Joint Test Force is composed of Air Force, NASA and General Dynamics personnel.

The award honors the Advanced Fighter Technology Integration team as AFSC's best test unit, specifically lauding its contributions to the on-schedule, within-budget accomplishment of all AFTI Phase I test objectives and several aviation "firsts."

The team is part of the 6510th Test Wing at the Air Force Flight Test Center.



The AFTI/F-16 on a Flight over North Texas

# AFTI/F-16 Begins Second Phase of Testing With New Avionics, Other Systems

By Joe Stout

The AFTI/F-16 testbed aircraft recently began flying again after the installation of new avionics and other systems that will be assessed in Phase II of its flight test program.

The modifications were completed with the installation of two dummy forward-looking infrared radar (FLIR) sensor/tracker pods on the aircraft's wing strakes, just outboard of the fuselage.

The aircraft has been returned to Edwards AFB, Calif., where more than 100 test flights were made during Phase I of the program in 1982 and 1983 — and at least 150 additional flights will be made in the second phase. The right-side dummy FLIR pod will be replaced with an operational FLIR unit later in the fall.

The AFTI/F-16 is an F-16 modified for use in the Advanced Fighter Technology Integration program, which is a joint effort of the U.S. Air Force, U.S. Navy, U.S. Army and the National Aeronautics and Space Administration. Fort Worth is prime contractor. AFTI is exploring how new technologies can be blended to increase the effectiveness of the pilot and aircraft.

The FLIR pod, in conjunction with a helmet-mounted sight, will be key hardware in Phase II testing. Phase II will concentrate on the aircraft's Automated Maneuvering Attack System (AMAS) — a concept integrating the capabilities of computerized flight controls and fire controls to achieve automatic delivery of weapons.

The goals of the concept are improved air-to-air and air-to-ground delivery accuracy during maneuvering and reduced workload for the pilot, according to Max Waddoups, Fort Worth's AFTI/F-16 Program Director. "The latter is especially important when applied to situations where the pilot approaches a target at low altitude to avoid enemy radar," he said.

One aspect of AMAS is an enhanced ability to deliver air-to-ground ordnance accurately during a banked turn. The pilot will be able to enter a potential target's reported location into the aircraft navigational system and proceed to the area under the cover of low altitude. When the target comes into view, the pilot will lock the FLIR onto the target after lining it up in his helmet-mounted sight. AMAS software will then calculate the optimum release point for accurate delivery during a projected turn and proceed to maneuver the aircraft and deliver the ordnance.

With conventional fighter systems, delivering air-to-ground weapons while maneuvering contributes significantly to aircraft survivability but is extremely difficult to do accurately.

In air-to-air gunnery, the AMAS is expected to triple the pilot's number of firing opportunities.

The modifications recently completed included updating the cockpit avionics on the AFTI aircraft to the configuration of those on the F-16C. Also, a color cathode-ray display was installed on a pedestal on the center floor of the cockpit for use in testing film-type and digital data base moving map displays. Other modifications included fuselage stiffening and installation of a cooling system to accommodate the operational FLIR pod, as well as AMAS-related changes to the digital flight control and fire control computers. The helmet-mounted sight will be tested with its full capability from the start of Phase II. The system was flight and safety qualified during Phase I.

The large storage capability and flexibility of the AFTI/F-16's digital flight control computer are at the heart of the AMAS technology. Much of the testing in Phase I of the program was dedicated to verifying the performance of the digital flight control computer and a major structural modification that was made to the AFTI/F-16 airframe — two movable canards, or fins, added to the forward fuselage underneath the crew station. The canards endow the aircraft with such new ways to fly as the pilot's capability to point the nose and make limited turns without banking.

Program test and evaluation director Robert A. Gill of the USAF Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio, described the Phase I test program as highly successful. Phase I testing also centered on advanced multi-purpose cockpit displays and voice command — a technology that allows the pilot to tell the aircraft what to do next. The voice command testing explored utility factors such as the effects of g's and noise in the cockpit on words spoken into the system.

All of the AFTI/F-16 Phase II test flights will originate from the NASA Dryden Flight Research Facility at Edwards AFB. At least 35 of the missions will be flown over bombing ranges at Nellis AFB, Nev., to verify weapon delivery effectiveness and tactics using the unconventional AFTI/F-16 flight modes.



**Extenders Awaiting Duty.** Ten U.S. Air Force KC-10 Extenders sit on the ramp at Barksdale AFB, La., awaiting refueling missions. Convair builds the fuselages of the Extenders at its San Diego plant and ships them in three sections by barge to the McDonnell Douglas plant in Long Beach, Calif., for final assembly. Convair has delivered 48 of the fuselages since August 1979, and Air Force plans call for a fleet of 60 of this military version of the DC-10 airliner.

## GENERAL DYNAMICS

# World

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## Low, Lockard Get New Posts at Pomona



Low



Lockard

Two key management appointments have been announced at Pomona. Reginald G. Low has been named Division Vice President and Program Director-Standard Missile Programs and Jerry K. Lockard has been named Division Vice President-Research and Engineering.

Low, 50, had been Division Vice President-Research and Engineering since 1980. He will now be responsible for directing all development and production activities for the Standard Missile, a surface-to-air guided missile that is the primary anti-aircraft defense system on more than 100 U.S. Navy ships. A native of San Francisco, Low joined Pomona in 1957 as an electronics engineer and progressed

through key management positions, including Section Head of Autopilots and Guidance Computers, Manager of Computers and Servomechanical Design, Assistant Program Director of Stinger-POST and Director of Design Engineering.

He earned a Bachelor of Science degree in Electrical Engineering from the University of California, Berkeley, in 1957, and a Master of Business Economics degree from the Claremont Graduate School in Claremont, Calif., in 1968.

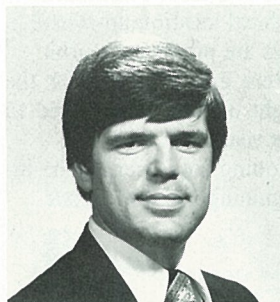
Lockard, 44, had been Chief Engineer and Technical Director-Standard Missile Programs since 1983. He will now be responsible for the direction and coordination of the division's research programs and engineering activities.

A native of Miles City, Mont., Lockard joined Pomona in 1962 as a junior engineer and later held engineering positions of increasing responsibility, including Group Engineer, Section Head, Manager of Missile Electronics Design and Director of Design Engineering.

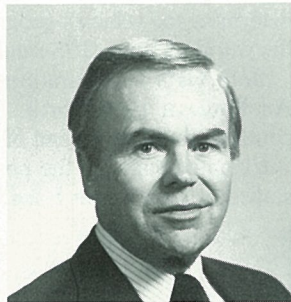
He earned a Bachelor of Science degree in Electronic Engineering from California State Polytechnic University, Pomona, in 1963, and a Master of Science degree in Electronic Engineering from California State University, Los Angeles, in 1973.

## Three Directors Named to New Convair Posts

Three management appointments have been made at Convair. They are: Randall K. Simpson to Director of Engineering Business Management, Ray V. Lubeck to Director of Commercial and Technology Marketing and Steven Ziner to Director of Management Information Processing and Control.



Simpson



Lubeck

Simpson joined Convair in 1972 as a reliability engineer and then served in engineering and management positions of increasing responsibility. He has been Manager of Automatic Test Equipment since July 1981.

He earned a Bachelor of Science degree in Electrical Engineering from San Diego State University in 1972 and

a Master of Science degree in Electrical Engineering from the same university in 1976.

Lubeck joined General Dynamics in 1958 as an electrical engineer at Pomona. He transferred to Electronics Division in 1979 as Director of Proposal Development. He was Director of Advanced Programs for Pomona's Marketing Department before appointment to his new position at Convair.

He received a Bachelor of Science degree in Electrical Engineering from the University of Utah in 1958 and attended Claremont Graduate School for two years, majoring in business.

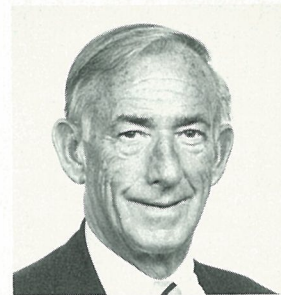
Ziner came to Convair from the Applied Technology Division of Western Gear Corporation. He previously held management positions at Rockwell and Sundstrand corporations. He earned a Bachelor of Science degree in Business from the University of Evansville in Indiana, with majors in accounting and psychology.



Ziner

## Dendo, Paige Named Marketing, Quality Assurance Directors

Two staff appointments have been announced at Electronics Division. Albert U. Dendo has been named Director of Marketing, and Jack D. Paige has been appointed Director of Quality Assurance.



Dendo



Paige

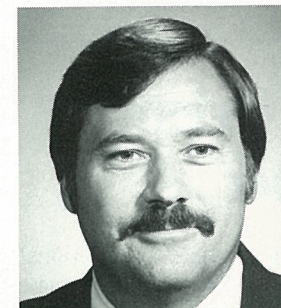
Dendo, 60, joined General Dynamics in 1979 as Manager of Planning and Requirements. He holds a Bachelor of Arts degree in Economics from Cornell University, a Master of Arts degree in Economics from American University and is a candidate for a doctorate in international relations at American University.

Paige, 54, joined General Dynamics in 1956 at Fort Worth and has held increasingly responsible positions in engineering and quality assurance. Prior to his present appointment, he was Manager of Quality Assurance at Fort Worth.

Paige earned a Bachelor of Science degree in Electrical Engineering from Texas Tech University in 1956.

## Beardsworth to Head Stinger Final Assembly

Don L. Beardsworth has been appointed Stinger Product Line Director at Pomona. He will be responsible for all Stinger weapon system final assembly and test operations.



Beardsworth

A native of Pomona, he joined the division in 1966. He became Production Control Supervisor in 1968, Master Schedule Analyst in 1970, Material Cost Analyst in 1973 and Chief of Manufacturing and Material Control in 1977. In 1978, he advanced to his most recent position as Manager of Manufacturing and Material Control.

Beardsworth holds an Associate in Arts degree in Business from Mount San Antonio College and a Bachelor of Science degree in Business Management from California State Polytechnic University, Pomona.

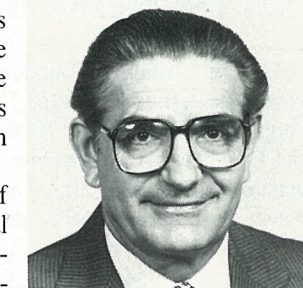
The Stinger weapon system incorporates a manportable, shoulder-launched missile and is designed for quick reaction to meet the threat of hostile fixed-wing and rotary-wing aircraft.

## Hannabarger to Direct Manufacturing, Material Control at Convair

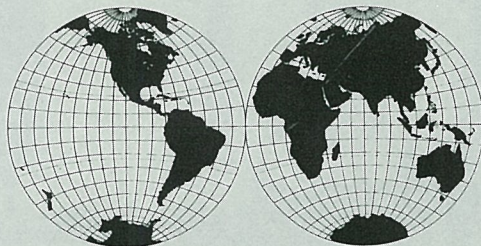
Donald E. Hannabarger has been named Director of Manufacturing and Material Control at Convair.

Hannabarger, 57, joins General Dynamics from the Ford Motor Company, where he was Director of Business Systems Development. He had extensive experience directing that company's manufacturing operations in South America.

He holds a Bachelor of Science degree in Industrial Engineering from the University of Illinois and a Master of Business Administration degree in Production Management from the University of Chicago.



Hannabarger



## Around the World

**CHQ:** Tracy R. Bennett joined as Corporate Manager Administration & Regulatory Affairs . . . Marcus P. Jolibois, Sheryl R. Lennon and James R. Tippen as Internal Auditor . . . R. Kent Nixon as Corporate Office Supervisor Support Services . . . Geraldine A. Sherwood as Corporate Cash Administrator . . . Paul R. LaBar as Corporate Pricing Analyst . . . Steven H. Hetelle as Senior Subcontract Auditor . . . Theodore R. Green as Financial Analysis Manager . . . Bruce L. Dirks as Corporate Financial Analyst . . . Michael J. Trask as Corporate Employee Communications Representative . . . David L. Heffron transferred from Pomona and was promoted to Corporate Manager-Business Planning . . . Athanasios Leris was promoted to Corporate Marketing Manager-Greece . . . John A. Rogerson to Aircraft Maintenance Chief.

**Fort Worth:** James H. Akin was promoted to F-16 Programs Director-Turkey Joint Venture . . . William J. Bond to Engineering Administrative Group Supervisor . . . Charles K. Brockman, Robert G. Collins, Gerald J. French, J. J. Petrey and James L. Quick to Project Manager . . . Jack D. Burkholder to Material Supervisor . . . Jack R. Clement Jr. to Finance Chief . . . Larry D. Cline to Senior Material Planner . . . David M. Cobb to General Foreman . . . William J. Creamer to Maintenance Services Chief . . . William O. Feild to Change Proposal Supervisor . . . John R. Hall to Senior Field Supply Analyst . . . Ronald J. Kacsmayk to Logistics Specialist . . . William G. Lawrence Jr. to Assistant Project Engineer . . . James E. May to Logistics Engineer . . . Matt B. Medders and Trent L. Sherrill to Manufacturing Control Supervisor . . . Joe M. Melton to Fire Chief . . . Kirby L. Moore to Engineering Chief . . . Oscar R. Morales to Project Coordinator . . . Conrad M. Morgan to Foreman . . . David F. Palmer to Engineering Manager . . . Charles D. Pennington to Administrative Assistant . . . Truman W. Reese to Material Control Chief . . . Philip N. Rigdon to Senior Program Analyst . . . Gerald T. Strickland to Subcontract Management Representative . . . Billy E. Thomas to Quality Control Field Engineer . . . Jesse B. Warren to Tooling Supervisor . . . James S. Wells to Technical Group Supervisor.

**Convair:** David D. Rousey was promoted to Manufacturing Manager . . . Bob E. Murkerson to Plant Protection Supervisor . . . Roderick J. Grove to Flight Operations Manager . . . Donald R. Hicke to Group Engineer.

**Electronics:** Helen M. Hills was promoted to Financial Specialist . . . L. C. Naughton Jr. to Customer Relations Specialist . . . Walter H. Olney to Principal Industrial Engineer . . . Jim H. Warren to Field Engineer.



## F-16, Phalanx Sales Proposed for Denmark And United Kingdom

The Defense Department has notified Congress of its intention to sell Denmark 12 additional F-16 Falcons and the United Kingdom 24 Phalanx ship-defense gun systems.

Denmark intends to use the additional Falcons to form a new squadron, which will be needed in the 1987-89 delivery time frame. Denmark originally purchased 58 F-16s, all of which have been delivered.

The proposed sale includes spares and support equipment, the Defense Department said.

The Phalanx sale to the UK would "significantly enhance the close-in anti-aircraft capability" of the British Navy, according to a Pentagon statement. The purchase cost includes spares, training and related support.

The Royal Navy initially purchased Phalanx systems for two aircraft carriers. This planned procurement will expand deployment of Phalanx on additional carriers and destroyer class ships.

## Stinger Scores Hit After Being Fired From Moving Vehicle

In tests conducted by the U.S. Army at the Yakima (Wash.) Firing Center, a General Dynamics Stinger missile was fired for the first time from a moving vehicle, scoring a direct hit on a ballistic aerial target.

Two additional Stingers were also test-fired successfully from the Avenger lightweight weapon system mounted on a High Mobility Multipurpose Wheeled Vehicle.

One test, conducted at night, resulted in a direct hit; the other, launched in rain from the moving vehicle, resulted in a tactical kill of the target.

Pomona supplied the Stinger launching system and provided integration, training and field support for the tests, sponsored by the U.S. Army Missile Command.

Stinger is an advanced heat-seeking anti-aircraft weapon. The shoulder-fired version, in production at Pomona, is now deployed with the U.S. Army and Marine Corps.

## New Tour of Orient Set for October

In response to the continuing demand, an additional "Window to the Orient" tour is being offered in late October. To date, 265 people have signed up from General Dynamics and its subcontractor companies, and the tour has been acclaimed as interesting, informative and enjoyable.

"Whether you want to go shopping for furs, suits, silks or jewelry in Korea and Hong Kong, take a trip to the DMZ, explore the classical capitals of Korea and Japan or take a sampan ride in Aberdeen in Hong Kong, this tour gives you a glimpse of the Orient, at a reasonable price," said Richard Bowhay, Corporate Manager-Offset and Business Development.

To sign up for this tour, call Barbara Walker or Mike Soliz at 800-321-9553 between 9 a.m. and 5 p.m. (PDT) as soon as possible.

The new itinerary includes:

Departing from L.A. - Oct. 26 to Nov. 10 Tour Price \$1,894,

Departing from N.Y. - Oct. 26 to Nov. 11 Tour Price \$2,210.

## 500th Sparrow 7M Guidance Set Delivered to Navy

General Dynamics' Camden operations reached a major milestone in the AIM/RIM 7M Sparrow Program during August by delivering the 500th guidance and control set to the U.S. Navy. The Sparrow AIM/RIM 7M is the latest version of the all-weather, air-to-air missile used by the Navy, Air Force and other allied air forces throughout the Free World.

Recent tests of the Camden-built missiles have been highly successful, with ground testing and operational firing results meeting the reliability standards set by Air Force and Navy testing organizations.

## Team Effort in Quality and Productivity

(Continued from Page 1)

"We have found that this approach is very effective," said Charles D. Anderson, Pomona's Vice President of Production. "We initiated our program with P-QIP teams in August 1983 in various areas, and they have been an outstanding success. We are currently working to expand the program to all areas as quickly as we can."

In setting up a P-QIP program for the corporation, 11 criteria were selected to serve as a measure of the company's productivity.

"One of our criteria is overtime," said B. E. Ewing, Land Systems Vice President-Manufacturing. "Heavy reliance on overtime to build our products increases our costs and decreases our productivity. As a result, we have been taking a close look at the two kinds of overtime — the sporadic and the consistent. The sporadic occurs when, let's say, a machine tool goes down and holds up essential production — then overtime is used to catch up."

"Special circumstances like that are one thing, but consistent overtime — a department recording hours and hours of overtime each week, each month, each quarter, that's something else," Ewing says. "It's expensive, and we're finding that if we look closely at the reasons for excessive consistent overtime, we can usually eliminate

them. That reduces our costs, and increases our productivity," he said.

The latest initiative on productivity, looking at the office, technical and support operations, is being conducted in selected office functions at Pomona, Convair, Land Systems, the Corporate Office and the Washington office. The functions include materials, finance, facilities and training.

"In the past, approaches to increasing productivity have been focused on the manufacturing operations," Jack N. Best, Corporate Director, Productivity Programs & Plans, said. "Now we are looking at our offices, where great improvements can be made, and at our support functions, which are very necessary but at the same time a very costly part of our total operations."

"The QIP effort will be going on for a long time," Best said, "and it may take years before we see concrete results. But if we don't make a concerted effort to improve the effectiveness of our operations now, we won't be around for very long. We have seen what happened to companies in other industries who didn't take productivity improvement seriously — they lost their competitiveness, they lost their markets; they were forced to close inefficient plants, and thousands of employees were out of work. We have to be certain the same thing doesn't happen to us."

## F-16s Testing New Airborne Equipment

Two Fort Worth-modified F-16As are being used at Edwards AFB, Calif., to flight-test two recently developed Global Positioning System (GPS) airborne receiver/processor equipment.

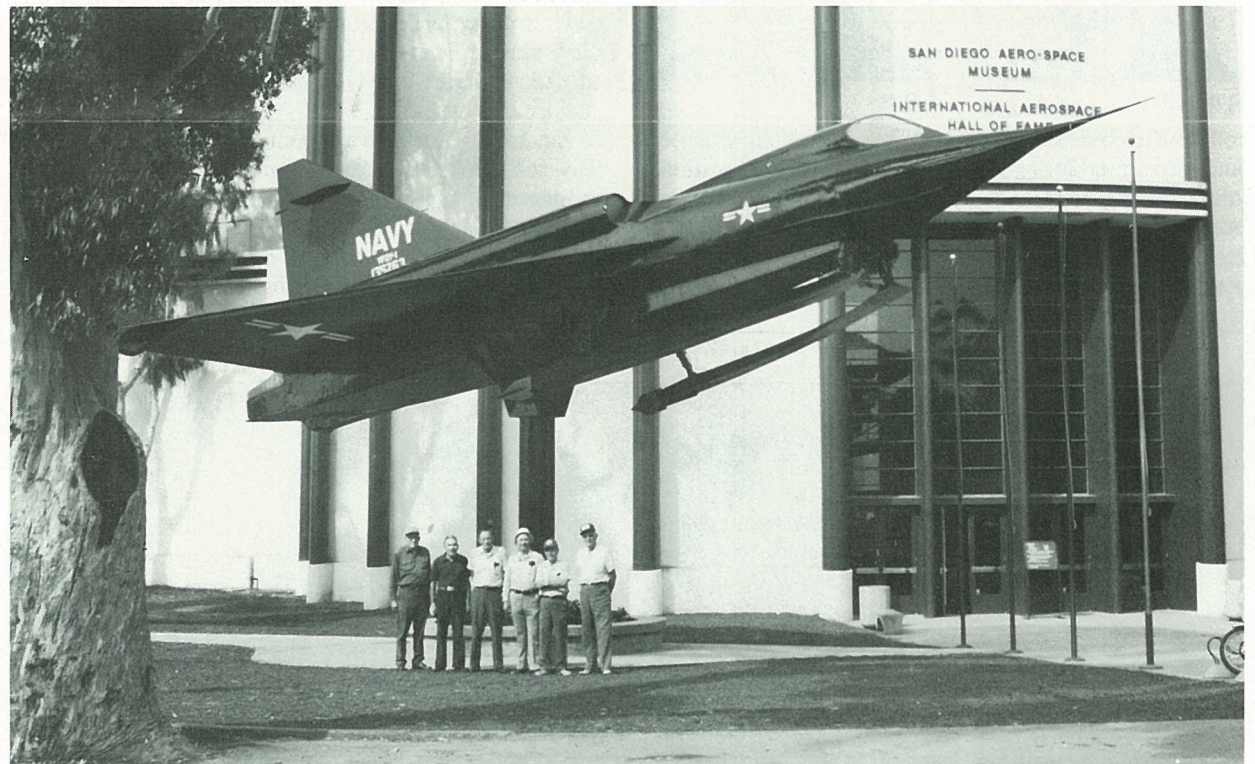
The two GPS sets were designed and built by competing electronics contractors, while Fort Worth developed the interfaces and associated aircraft avionics software and integrated and installed the systems.

The U.S. Air Force, Army and Navy are expected to select one of the GPS configurations next year for joint use. The Army and Navy are also testing GPS equipment on other types of vehicles.

The GPS concept calls for 18 or more Navstar navigation satellites to be placed in orbit by the late 1980s. Aircraft, ships and other defense systems equipped with GPS sets will monitor and track signals broadcast by the satellites. By tracking four satellites simultaneously, the crew of a vehicle hosting a GPS receiver/processor can accurately determine the vehicle's geographical location anywhere in the world. Several GPS satellites are presently in orbit.

Both GPS configurations were ground-tested for the Air Force at Fort Worth. Flight testing is scheduled to continue through the end of the year.

Planning calls for the positioning equipment to be installed on production F-16s beginning late this decade.



**Sea Dart Restored.** Six retired employees who helped restore a Convair-built XF2Y-1 Sea Dart for San Diego's Aerospace Museum pose under the plane shortly after it was placed on a pedestal for display. Left to right are: Ed Lanpey, Jim Volkov, Volney Minor, Joe Miller, Mike Alianelli and Vince Marvoneck. The Sea Dart, a jet-powered seaplane built in the mid-1950s, was donated to the museum in California by the Navy and refurbished by a group of active and retired Convair employees. Five of the delta-winged experimental planes were built. Another Sea Dart is at the Smithsonian Institution in Washington, D.C.

## Records Retention Vital to Fort Worth Projects

If you need Fort Worth employee timecards from 1964, original production drawings of F-111 wing components or Fort Worth financial records from 1942, the place to find them is a 49,000-square-foot warehouse a few miles from the main Fort Worth plant.

This vital records retention area, frequently called the archives, contains materials and records considered important to Fort Worth's continued operations. Some of the items are stored because of government requirements, some because they relate to work now being done and some because they may be needed for future reference. Many of them date back to 1942, the year the factory opened.

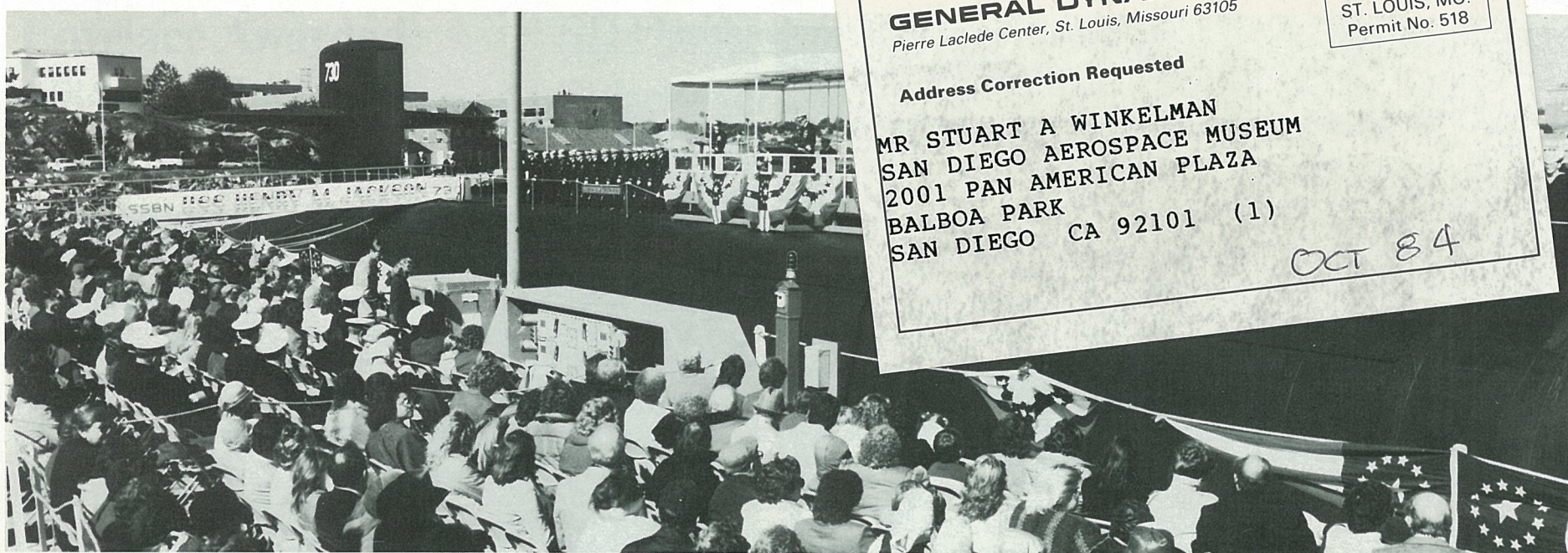
Each item in the archives is accompanied by a disposition and destruction notice that specifies the date on which it can be removed. The length of time the material is

retained varies from one year to permanently, according to James Gregory, an office services supervisor who is also Division Vital Records Coordinator.

The warehouse presently contains approximately 80,000 boxes of unclassified materials stored in 13-foot-high bins. The boxes range from time-card size to engineering drawing size.

Gregory said the bulk of the material in the warehouse relates to design, production and support of the F-16 and the F-111. Thousands of boxes were removed from the archives in the late 1970s after the Air Force took the B-58 out of service, Gregory said. Other items are being removed continuously as their retention periods end. For example, a recent task was disposing of time cards from the early 1960s.





GENERAL DYNAMICS

# World

Volume 14 Number 10

October 1984

## GD and Grumman In Joint Effort For Space Station

General Dynamics will team with Grumman Aerospace Corporation in competing for one of the prime contractor roles in NASA's Space Station Program.

Oliver C. Boileau, President of General Dynamics, said the combined effort will be headed by William F. Rector, who has been named Vice President-Space Station Program. Boileau said the General Dynamics-Grumman partnership "offers ideal complementary capabilities" to support the Space Station work package being managed by NASA's Marshall Space Flight Center, Huntsville, Ala. General Dynamics and Grumman participated in the Space Station definition studies recently completed for NASA.

George M. Skurla, Chairman and President of Grumman Aerospace, said that Grumman's role will focus on laboratory outfitting and thermal systems. "We look forward to this important opportunity to contribute to the Space Station Program with General Dynamics," Skurla said. "We consider this program to be an exciting challenge."

Boileau said that the team will be centered at Convair in San Diego, Calif., and will also draw upon the experience of employees from a number of other General Dynamics divisions.

General Dynamics has played a key role in the U.S. space program since the 1950s. Convair designed and builds the Atlas launch vehicle and high-energy Centaur booster and is currently developing a more powerful version of Centaur for planetary and geostationary missions from the Space Shuttle. Convair also designed and built the orbiter midfuselage for the Shuttle, and Grumman designed and builds the Shuttle's wings. A major participant in the manned spacecraft program, Grumman designed and produced the Lunar Excursion Module for Apollo.

## Atlas Launches Satellite

A General Dynamics Atlas booster successfully launched the 10th NAVSTAR satellite into orbit from Vandenberg AFB, Calif., in September.

Atlas booster 14E, built in the early 1960s as an Intercontinental Ballistic Missile, was used to place another in the series of navigation satellites into an elliptical orbit, from which it was later placed in a circular orbit 12,000 miles above the earth.

One more satellite is due to be launched in the test program. Production satellites will follow in 1986.

The NAVSTAR satellites for the Global Positioning System are used to provide precise position and navigational information to U.S. ships, aircraft, ground vehicles and troops.

**Trident Joins Fleet.** The U.S. Navy's newest Trident ballistic-missile-firing submarine, USS *Henry M. Jackson*, was commissioned and formally joined the fleet October 6th at the Naval Underwater Systems Center in New London, Conn. A crowd of 1,000 guests and spectators heard a number of speakers praise the late senator for whom the ship is named.

## Sen. Henry M. Jackson Lauded At Commissioning of Trident

USS *Henry M. Jackson* (SSBN 730), the nation's fifth Trident ballistic-missile-firing submarine, joined the fleet October 6th amidst praise for the late senator, for whom she is named.

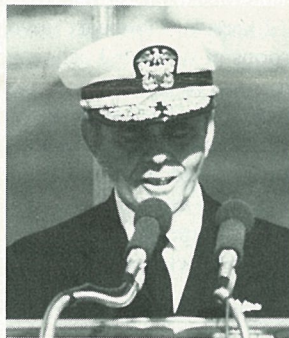
"For those who grew up in the submarine force, Senator Jackson was something of a patron saint," said Admiral Kinnaird McKee, Director of the Naval Nuclear Propulsion Program, as he addressed a pierside crowd of 1,000 guests and spectators during commissioning ceremonies at the Naval Underwater Systems Center in New London, Conn.

"From the very outset," Admiral McKee said, "Senator Jackson recognized the vast potential of nuclear propulsion for warships, particularly submarines . . . and he continued to play a major role in developing nuclear power for peaceful as well as for defense purposes."

"It's really hard for me to imagine," Admiral McKee said, "where we would be today in our Navy had it not been for his insight and his early strong and unequivocal support for this new technology."

Admiral McKee said Jackson would have been proud of his namesake "because she is part of his legacy and proof — eloquent proof — of his abiding interest in our Navy and our nation."

Admiral McKee called the 560-foot, 18,750-ton ship "the most effective warship of its kind in the world today. At a time when some people say the ocean is transparent . . . this ship is invisible on station. At a time when weapon costs seem extraordinary, this ship is a bargain." The admiral spoke of the deterrent factor of Trident submarines.



Admiral McKee

"We'll truly be successful, if, 25 or 30 years from now, we haul down the flag on *Henry M. Jackson* and she has never fired in anger. . . . It is these ships that have maintained the deterrent value of our armed forces above the threshold of risk."

Arthur Barton, Division Vice President-Finance and Strategic Planning, who represented Electric Boat at the event, echoed Admiral McKee's sentiments: "This ship," he remarked, "carries the name of this great American, who in his foresight was a staunch supporter of a strong Navy and the Trident program. Today . . . she will join her sister ships to strengthen America's strategic deterrent."

Vice Adm. Nils Thunman, Deputy Chief of Naval Operations for Submarine Warfare, praised Senator Jackson, and then complimented the Electric Boat workforce. "This is the 17th submarine delivered by Electric Boat during my tenure (three years), all of which have been delivered on schedule as established in 1981," he said. "I would like to congratulate Electric Boat and the many shipyard workers who labored so hard to achieve this impressive record."

The highlight of the ceremony came when the ship was placed in commission. With the Navy Northeastern Band playing "The Star-Spangled Banner," a crewmember ran up the national ensign and the Navy commissioning pennant on a flagstaff on the after edge of the superstructure.

Immediately following, Captain Ralph Tindal and Captain Michael Farmer, commanding officers of the ship's blue and gold crews, respectively, read their commissioning orders.

Anna Marie Jackson, the submarine's sponsor and daughter of the late senator, attended the ceremony with her mother, Helen Jackson. Also on hand was U.S. Representative Allen Swift of Washington's Second Congressional District. There was also a contingent of 110 residents of Everett, Wash., including Mayor Bill Moore, in the audience. Everett was the late senator's hometown.

## Fort Worth to Proceed with Initial Phase Of Enhancing F-16A/B Capabilities

The U.S. Air Force recently authorized Fort Worth to proceed with the initial phase of the F-16A/B Operational Capabilities Upgrade (OCU) program, under which the USAF and European air forces will retrofit a significant number of their Falcons with enhanced capabilities.

Planned improvements include expanded avionics computer capacity, provisions for beyond-visual-range and antishipping missiles, a data transfer unit to reduce pilot workload and a radar altimeter to enhance low-altitude flight safety.

The aircraft to receive the changes, designated Block 15 F-16s, were produced in Phase I of the Multinational Staged Improvement Program (MSIP) and already have some of the structural and wiring features needed for the systems.

In the future, the program could be expanded to include all USAF F-16A/B Block 15 aircraft as well as follow-

on Block 15 Falcons to be built in Europe in the late 1980s, according to Tom Collins, OCU Program Director.

Engineers at Fort Worth are now working on the design/procurement stage of the initial program. Flight testing with the new equipment is scheduled to take place in 1985 and 1986, and the first modifications, accomplished by the USAF Logistics Command at Ogden, Utah, with Fort Worth-supplied kits, will begin in late 1987. Modification of the European aircraft will be accomplished in their respective countries.

Two of the changes will give the aircraft's fire control computer and central interface unit the expanded capacities needed for the USAF advanced medium range air-to-air missile (AMRAAM) and the Royal Norwegian Air Force Penguin missile. A large computational reserve to accommodate future improvements will also result from the computer memory expansion.





**Abrams Tanks Show Capabilities.** Land Systems-produced M1 tanks impressed both friendly and "enemy" forces as they rolled through cities and the countryside during a series of exercises that were part of the annual NATO maneuvers in West Germany. This year's maneuvers, held in September, were called Autumn Forge 84.

## M1 Draws Praise from Friend and "Foe" Alike in NATO Exercises

The M1 Abrams tank drew rave reviews from both its own and opposing forces in the recent series of NATO exercises in West Germany.

Maj. Gen. Howard G. Crowell Jr., Commander of the U.S. Army's 3rd Infantry Division, said, "The superiority of the tank is fantastic. It will be able to meet any threat or foe it may encounter." His division, which is headquartered at Würzburg, West Germany, participated in an exercise called "Certain Fury."

In another exercise, called "Lionheart," British forces, which took the role of the enemy, were surprised by the fast maneuvering capability of the M1, according to published reports. Newspaper articles said that the M1 operated with very few breakdowns and greatly impressed the British with its speed.

Exercise Certain Fury, which involved 50,000 troops at Crailsheim, West Germany, was observed by Ron Pickard, Liaison Engineer for Land Systems' Supplier Quality Control.

"In the entire time I was there," Pickard said, "I did not hear one unfavorable comment on the M1." Pickard quoted one cavalry officer as saying, "This is the Cadillac of tanks. It has no equal."

"Other members of the unit agreed, saying the excellent workmanship generates a high level of confidence in performance," Pickard said.

The exercises also interested German civilians. "The local people turned out to see the convoys of tanks roll through their town as though they were watching a parade," Pickard said.

Throughout all the exercises, "the performance of the M1 exceeded our already high expectations," Pickard said.

Certain Fury pitted the "friendly" force of the 3rd Infantry Division and the 2nd Armored Cavalry Regiment from Nuremberg, West Germany against the "enemy" force of the 5th Infantry Division (Mechanized) from Fort Polk, La., the 1st Infantry Division from Goeppingen, West Germany, and the 2nd Battalion, 75th Rangers from Fort Lewis, Wash.

Certain Fury, Lionheart, Cold Fire and other exercises were part of the maneuvers held annually by NATO since 1967 under the title REFORGER (Return of Forces to Germany). This year's maneuvers, which took place September 17th-27th, were named Autumn Forge 84.

Exercise Lionheart involved 131,000 British "Blue" troops in simulated action near Einbeck, West Germany, designed to test their responses to attack. "Orange" forces of 13,200 U.S., West German and Dutch troops were commanded by a British general, who used them to surprise and test the British defenders in as many kinds of attacks as possible.

Newspaper articles, reporting on Lionheart and on the British reaction to opposing the American M1, quoted

Lt. Col. Pat O'Neill, Executive Officer of the U.S. Army brigade from Fort Hood, Texas, that was airlifted to West Germany for the exercise.

Colonel O'Neill described how about 60 tanks and armored vehicles from his 241st Infantry Battalion outflanked a British light infantry unit in a swift maneuver during early morning darkness.

Colonel O'Neill said the defenders are "not accustomed to our speed . . . It cuts their thinking time, and (with the M1) we can now move three times as fast as in the past."

A valuable advantage, noted Colonel O'Neill, was that the defenders seemed "clearly vulnerable" to surprise attacks at night by armor that has the night vision and night-fighting equipment of the M1. "We clearly prefer to operate at night," he said.

Colonel O'Neill added that, in the two weeks of operation with 116 M1s and 67 armored vehicles, only one tank and one armored vehicle had major failures. All the brigade's equipment is prepositioned in Germany, and much of it had been stored for two and a half years or more, he said. This is the first time the American armor had been pulled from these stockpiles.

The low maintenance statistics are even more impressive, Colonel O'Neill said, since the brigade operated far from its normal European area and with equipment in storage for a long time.

## Convair Receives Contract for Modules For Heavy ICBM

Convair has received a \$3 million follow-on contract from AVCO Systems Division to build five more Composite Deployment Modules for the Peacekeeper ICBM. Peacekeeper is the name for the nation's newest heavy ICBM, formerly called the MX.

The new contract calls for the five modules to be built using production procedures, preparing the company for future rate production.

Built of aluminum and graphite-epoxy composite, each module is 15 inches high, 92 inches in diameter and weighs 265 pounds. Convair delivered 20 modules under its original contract for the full-scale engineering development program for the missile.

The deployment module is installed just forward of the missile's fourth stage and serves as the platform supporting the re-entry vehicles. Peacekeeper will be able to carry up to 10 independently targeted re-entry vehicles.

## Centaur Upper Stage Picked as Booster For Venus Radar Mapper Spacecraft

Convair's Centaur high energy upper stage, already being developed for four missions from the Space Shuttle, has also been picked by NASA to boost the Venus Radar Mapper spacecraft, according to Joseph Mahon, NASA's Director of Space Transportation System Support Systems.

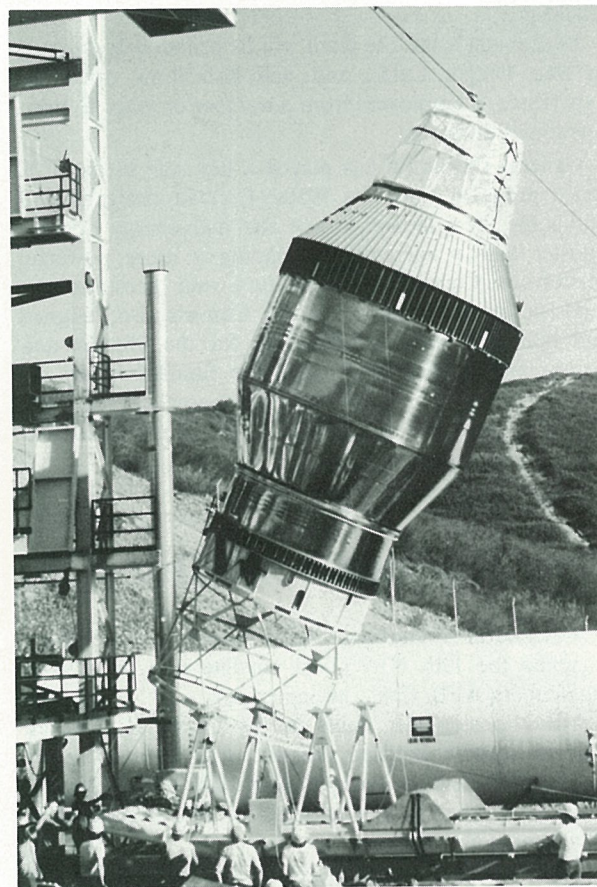
The Venus Mapper will be the first NASA mission to use the G version of the Centaur, which will be used initially for Department of Defense missions from the Shuttle. The longer G-Prime version of Centaur had been selected earlier for the Galileo probe to Jupiter and for the Ulysses (formerly International Solar Polar Mission) probe to Jupiter and then out of the ecliptic plane into orbit over the sun's poles.

In a recent interview with Space Commerce Bulletin, Mahon said that Centaur was selected for the 1988 mission because it best met the performance requirements for the Venus probe. Three other boosters were considered and rejected for the mission.

Meanwhile, work is progressing at Convair on the first Shuttle-Centaurs, according to Martin Winkler, Program Director. The first test articles of both the Centaur and its Consolidated Support Structure are well into structural testing, and construction of the first G-Prime flight articles is under way. Both Galileo and Ulysses are scheduled for launch within a two-week period in 1986.

According to Mahon, NASA will negotiate the final terms of the contract with Convair, a contract that will also include two additional Centaurs for Department of Defense use.

The space agency plans competitions for three more upper stages this fall, including the Mars Geoscience Climatology Orbiter and two Tracking and Data Relay Satellites. Centaur is expected to be a contender for these missions.



**Readied for Testing.** The first Shuttle/Centaur Test Article is hoisted into place in the test stand at Convair's Sycamore Canyon (Calif.) Test Site, where it will undergo a six-month series of design evaluation tests, including cryogenic tanking, structural loading and modal surveys.

GENERAL DYNAMICS

# World

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## Lovelace Awarded 1984 von Karman Medal in Norway

Dr. Alan M. Lovelace, Vice President-Productivity and Quality Assurance, has been awarded the 1984 von Karman Medal by NATO's Advisory Group for Aerospace Research and Development (AGARD).

The presentation of the medal and a citation was made to Dr. Lovelace during the AGARD annual meeting held on September 20th in Oslo, Norway.

The medal is a silver replica of the gold medal presented to Professor Theodore von Karman in 1962 on the 10th anniversary of AGARD. It is awarded for outstanding contributions to aerospace science and technology and to the enhancement of progress in scientific and technological cooperation among the NATO nations, carried out in conjunction with AGARD activities.



The von Karman Medal



Dr. Alan M. Lovelace

According to the citation, Dr. Lovelace served as a U.S. Air Force member of the AGARD Structures & Materials Panel from 1966 to 1973. After joining the National Aeronautics and Space Administration in 1975, he was appointed the NASA U.S. National Delegate to AGARD. He was elected Chairman of AGARD in 1979, serving in that position until March 1982. During his tenure as Chairman, significant initiatives benefiting the research and development establishments in the NATO Southern Flank Nations were undertaken, and Project 2000, a major technology forecast study, was completed. In his capacity as Deputy Administrator and Acting Administrator of NASA, he was responsible for the development of many aeronautical and space programs.

"In particular, he was directly responsible for the direction of the Space Shuttle Program, which culminated in the successful flight of the first reusable manned space flight vehicle. He also played an important managerial role in the cooperative Spacelab Program, in which the nine European member countries were responsible for the design and development of the Spacelab itself, while NASA provided the launcher and the Space Shuttle to carry the laboratory into space and return it to Earth," the citation said.

Dr. Lovelace joined General Dynamics in July of 1981.

## GD Flashback

### Subchasers Met U-Boat Threat in WW I

The Allied nations in both world wars owe a debt of gratitude to Henry R. Sutphen, who headed the Electric Boat Company's Elco division in 1915. A novel idea he had that year led to the development of the subchaser in World War I and the PT boat in World War II.

Germany, at the outbreak of the First World War, had an awesome fleet of submarines that could have won the war had it not been for three successful Allied countermeasures — the use of the convoy system, accelerated ship construction which quickly replaced the staggering losses and the use of small, fast motorboats called subchasers.

For his role in the development of the third countermeasure, Sutphen earned the title of "the father of the American torpedo boat."

The idea of using small, fast boats as armed naval vessels was established in the early 1900s. England, Italy and Germany had taken an active part in the development of these boats by the beginning of the war, but they were used only against surface ships.

England was suffering heavy shipping losses to German undersea boats in February 1915 when Sutphen had this idea, which he proposed to the British: Why not build light, ocean-going motor launches primarily as antisubmarine vessels?

Sutphen based his proposal on Elco's long experience in the standardized construction of electric launches, power lifeboats, gasoline cutters and custom-made cabin cruisers. Elco, in fact, was formed as the Electric Launch Company in 1892 for the purpose of building 54 36-foot electric launches for the World's Fair in Chicago in 1893. Elco eventually became a leader in the manufacturing of small boats of many types.

The British liked Sutphen's idea but laid out specifications that Sutphen labeled as "impossible." The British wanted a fast, powerful, well-armed boat tough enough for North Sea operations yet small enough to be carried on a transport's deck. Sutphen put Irwin Chase, his chief designer, to work on the project, which resulted in an order for 50 boats.

The British called the new boats MLs, for "Motor Launches."

Elco's boats ML #1 through #50 were wooden-hull vessels 75 feet long, with a relatively narrow beam of 12 feet and weighing 34 tons. They were armed with a 3-inch gun and fitted with depth charges. Two 220-horsepower gasoline engines gave the boats a top speed of 19 knots. They were manned by eight officers and men.

Since the United States was neutral at the time, the 50 boats were sent from Elco's Bayonne, N.J., plant to Canada as "yachts," painted white with fancy names on their sterns. From Canada they were shipped to England.

The British were pleased with their MLs, and, when the *Lusitania* was torpedoed and sunk on May 7, 1915, they quickly cabled an order for 500 more at a total cost for all 550 boats of \$2 million. The second order, for MLs #51 through #550, specified that they were to be assembled in Canada with parts prefabricated at Bayonne.

The newer MLs were slightly larger than the first boats; they were 80 feet long and weighed 37 tons. The crew was increased to nine.

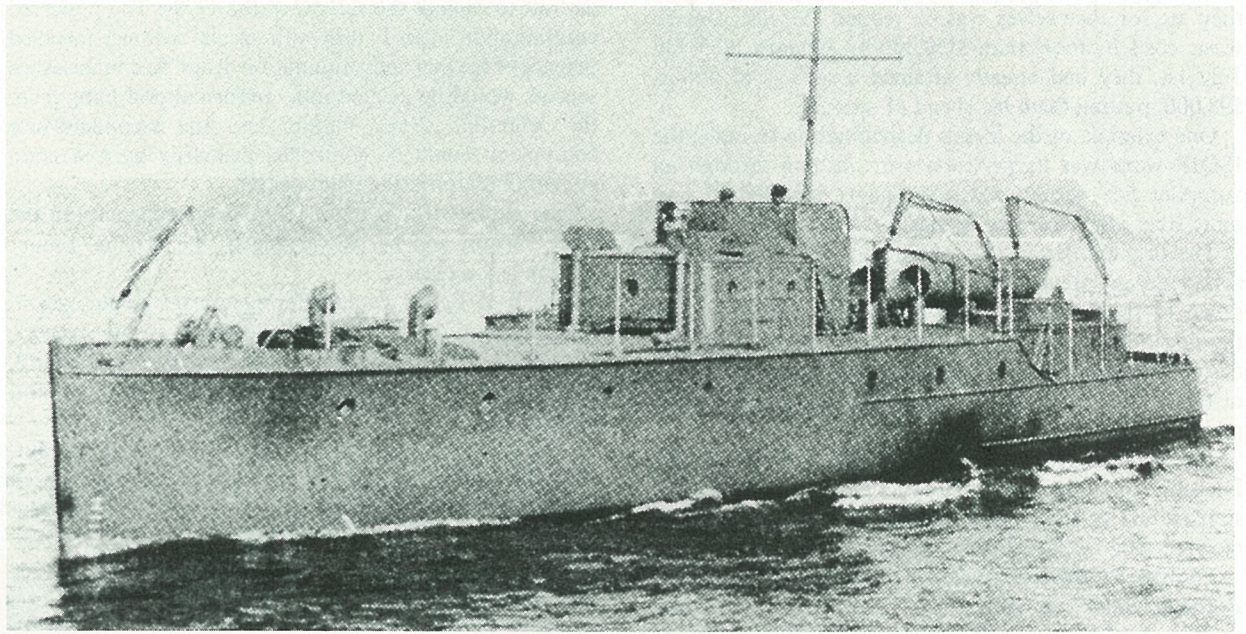
In a complex operation worthy of today's "systems" managers, Elco collected tons of materials at Bayonne and sent 3,000 carloads of crates to Montreal and Quebec for assembly. The completed boats were shipped to Halifax for loading aboard transports bound for England.

Elco's part in the building of the MLs was a remarkable achievement for a small firm; Elco delivered all 550 MLs in 488 days. The 80-foot MLs were assembled in Canada at the rate of one a day.

The subchasers, nicknamed the "mosquito fleet," served the British well. They patrolled the home waters, the Mediterranean and the Dardenelles, where their presence alone caused the Germans to alter their U-boat operations. In addition to successful antisubmarine duties, they carried out rescue work and convoy duties, laid and swept mines and took part in dramatic raids on enemy shores. The British lost 24 MLs in wartime operations and lost another in the Rhine River in 1919 because of a fuel explosion.

Altogether, Elco built a total of 722 subchasers for the British, Italian, French and American navies, the U.S. Navy getting 30 after America entered the war. The production total was more than that of Germany and all the other boat producers in the world combined.

New and untried in 1915, the Elco subchasers became the speediest and most streamlined vessels in the Allied fleets. The basic idea was such a good one and the battle-proven design was so sound that Irwin Chase had to do it all over again for the famous "expendable" PT boats of World War II.



One of Elco's 722 World War I Subchasers

## Fort Worth Receives Award for Its Cooperative Education Efforts

Fort Worth recently received Texas A&M University's fall 1984 Outstanding Co-op Employer Award in recognition of the outstanding cooperative education the division provides to university students in a variety of engineering disciplines.

In a ceremony at the division, Vice President and Division General Manager Herb Rogers accepted the award from Steve Yates, Texas A&M's Director of Cooperative Education. Charlie Anderson, Vice President-Engineering, and Dan Zimmer, Vice President-Industrial Relations, also represented the division.

Attending from Texas A&M were Dr. Charles McCandless, Associate Provost, Dr. Wayne Terrell, Associate Director of Cooperative Education, and Dave Worley, Assistant Director of Cooperative Education.

Twelve students from the university are currently participating in the division's co-op program on an alternating basis. Four are working now, and eight are attending classes on campus after working at Fort Worth

last summer. The eight will return to the plant when their colleagues return to classes.

The students are enrolled in aeronautical, electrical, mechanical and computer science engineering courses. They work closely with regular Fort Worth employees.

In presenting the award, Yates said Fort Worth was chosen because of the quality and variety of co-op work assignments, number of students involved and the company's administration of the program. He said the quality of work assignments is measured by the comments received from students in written reports and personal interviews. "Over the eight years of the co-op program, the quality of the students' assignments at Fort Worth has been outstanding," he said.

Yates specifically lauded Joy Gardner, co-op coordinator in Fort Worth's Engineering Personnel section, for her contributions to the program's success. He said his office routinely contacts more than 600 employer representatives from a variety of companies, and said,

"I'd have to rate Joy as being in the top three of all the people we deal with." He also praised the support provided to the program by Morris Scales, Professional Development Supervisor in Engineering Personnel.

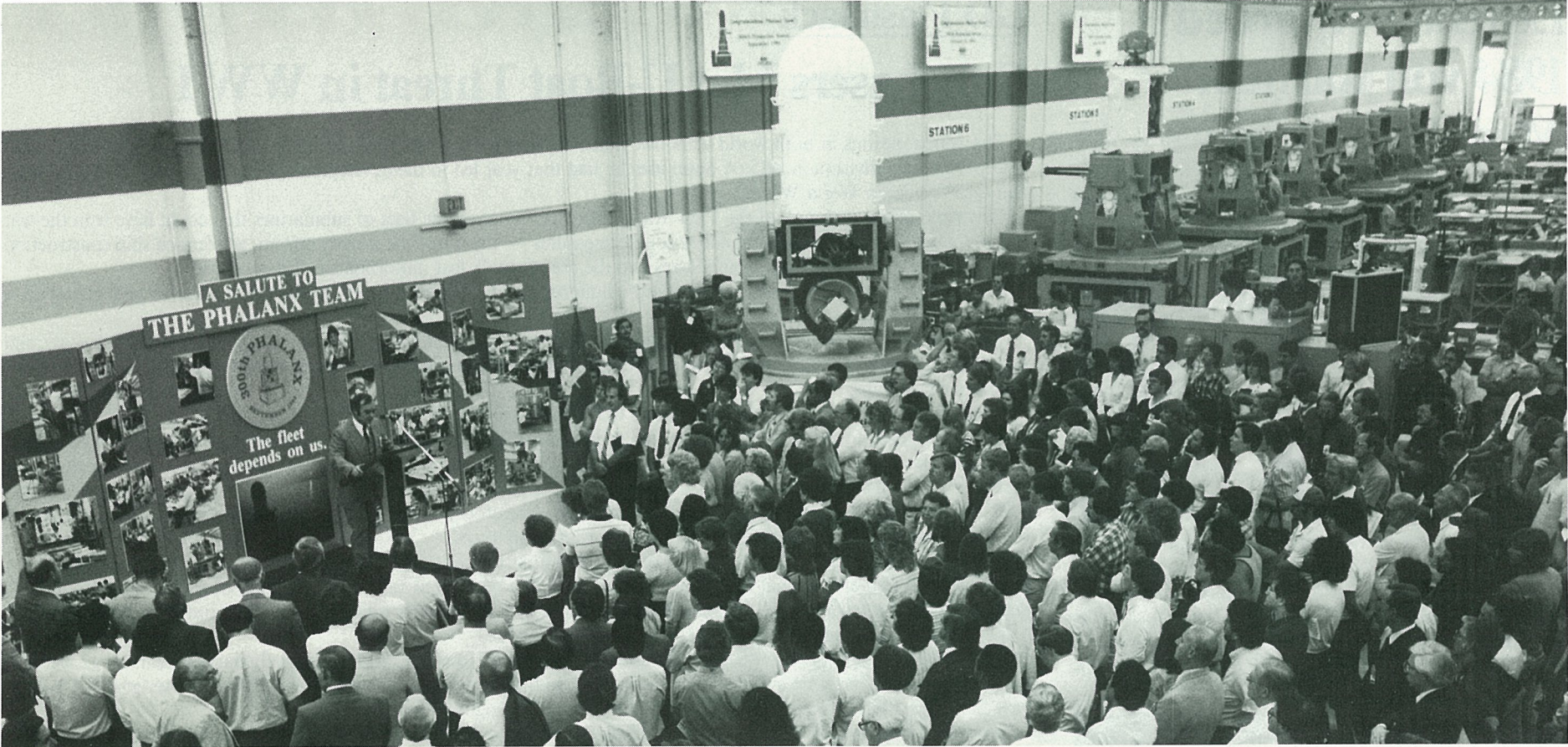
On receiving the award, Rogers said General Dynamics views cooperative education as mutually beneficial to students and the company. It is especially valuable as a recruiting tool, he said.

"I think the fact that the program is well organized is what is really making it work, both on our end and on the scholastic end," said Rogers. "We look forward to continuing the program with Texas A&M and other colleges."

Fort Worth has co-op programs with 10 universities in six states. Other schools will be added soon.

Fort Worth's program will soon be expanded to include more nonengineering career fields such as accounting, personnel administration and others. Anderson said the co-op program in engineering will continue to grow.





**Phalanx Team Praised.** J. D. Gamer, Director of Acquisition and Engineering Division, Naval Sea Systems Command, praised Pomona's Phalanx team and its suppliers for their outstanding production performance in maintaining ahead-of-schedule Phalanx deliveries for 38 consecutive months. Gamer spoke during a production milestone ceremony held on the Phalanx production line on September 26th.

## Production Quality Improvement Team Reports Success

The Production Quality Improvement Program (P-QIP) Team from Pomona's Dept. 62-098, Printed Wiring Boards and Flex Harness Fabrication, has made an impressive reputation for itself. So much so that its team leader, Supervisor Jackie Leavell, was asked to discuss the team's successful efforts at the Corporate Quarterly P-QIP Review held at Quincy Shipbuilding recently.

This P-QIP Team is one of the original 10 pilot teams at Pomona, first organized in November 1983. The goal they set for themselves was to reduce the cost center's waste costs by more than \$150,000 by January 1985. On July 1st, they had already attained a savings of almost \$98,000, putting them far ahead of schedule.

One example of the team's determination to make the P-QIP work was its persistence in pushing through an autopilot flex harness redesign that is expected to save more than \$15,000 a year in waste.

The original design was outdated and inefficient, but a new design previously submitted had become bogged down in the system. The P-QIP team recognized that the new design would drastically reduce waste. The new design eliminated the need for spotfacing by the utilization of plated through holes for the solder terminated circuit pads.

The team presented its findings to Charles D. Anderson, Division Vice President of Production, and his executive staff at one of the regular monthly P-QIP reviews and received their overwhelming support.

Though P-QIP teams usually focus on the "Top Ten Problem Parts" in their areas, every part undergoes examination for possible improvement in quality or producibility. This is one of the requirements to accomplish the goal of reducing costs by eliminating waste.

P-QIP Team members from Dept 62-098 include Superintendent Lew Blum, Manufacturing Engineers Pat Ulloa and Joe Russo, Manufacturing and Material Control representative Barbara Chindlund, Quality Inspection representative Karen Flynn, Plant Engineering representative David Wucherpfenning, P-QIP Coach Marion Wells and P-QIP Monitor Melanie Young.

## Fort Worth Awarded Air Force Contract For Initial F-16 Recce Modification Work

Fort Worth has been awarded a U.S. Air Force contract for initial efforts toward flight demonstration of enhanced reconnaissance capabilities to be integrated on a modified F-16.

Flight evaluation of the F-16 "recce" systems is scheduled to take place in 1985 and 1986 at Edwards AFB, Calif. This phase will be complemented by tests of the F-16 Recce cockpit mechanization in Fort Worth's Flight Simulation Facility.

The Air Force is considering adopting a modified version of the F-16 as its principal tactical reconnaissance aircraft to replace the RF-4C in the 1990s. The preferred configuration is an F-16D with special avionics installed in place of the gun and ammunition drum. Reconnaissance sensors would be located in a conformal pod hung from the centerline stores station, and the reconnaissance equipment would be controlled primarily by a weapon system operator in the rear cockpit.

The aircraft would retain a multirole capability in the recce version and be convertible to the original fighter version as necessary.

The F-16 Recce would offer significant advantages in a number of areas, including mission responsiveness, mission reliability, imagery resolution, survivability, supportability, readiness and surge capability and affordability.

"The aircraft concept includes automatic terrain-following radar and a wide-angle forward-looking infrared sensor to enhance navigation and safety while flying at low altitude and under the weather, as is typical of the

reconnaissance scenario," said Paul Henkel, Project Engineer for the program.

The system will provide a "near-real-time" reconnaissance capability, which is something the Air Force has sought for a long time, Henkel said. Current recce systems use film cameras and require several hours after landing before the imagery/intelligence can reach the requestor. This delay is due to the time taken developing, editing and interpreting hundreds of photos after each mission.

Near-real-time capability will require three airborne elements, Henkel said: electro-optical sensors, in lieu of film cameras; an imagery management system and a data link.

The imagery management system would consist of videotape or disc recorders and a processor for inflight review and editing of imagery, thereby limiting the number of frames to be sent to ground stations. "Over-the-horizon, real-time recce capability could be obtained with satellite or airborne relays, if desired," Henkel said.

Once sent to ground stations, the imagery would be quickly interpreted and disseminated through electronic channels.

Fort Worth will design and build the recce pod and perform the systems integration, while reconnaissance equipment will be supplied by subcontractors. Most of the equipment is now under development.

Current planning is for F-16 Recce aircraft/pod full-scale development to begin in 1986. The first production recce Falcon would be built early in the next decade.



Mock-up of Pod Containing Reconnaissance Sensors Mounted on F-16D

### Savings and Stock Investment Values

Salaried	Aug. 1982	Aug. 1983	Aug. 1984
Government Bonds	\$ 3.1132	\$ 3.4905	\$ 3.8086
Diversified Portfolio	2.0660	3.1197	3.1938
Fixed Income	1.3786	1.5443	1.7345
Hourly			
Government Bonds	3.1113	3.4885	3.8070
Diversified Portfolio	2.1088	3.1840	3.2412
GD Stock	\$33.5000	\$47.7500	\$64.5000



## Lynch and Mitchell Get New RAM Posts

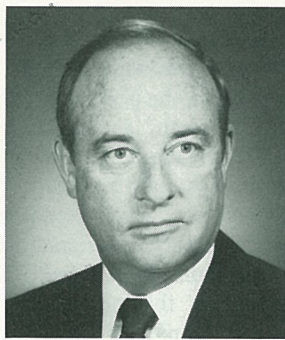
Two appointments have been announced for the RAM program at Pomona: Donald J. Lynch has been named Director of RAM Systems Engineering, and Dwight G. Mitchell has been named RAM Chief Engineer and Technical Director-RAM Missile.

Lynch, Chief Engineer and Technical Director-RAM Missile since 1983, will have responsibility for all systems engineering activity in support of the RAM program. Mitchell, Engineering Manager for Electro-Optical Products Design since 1981, will be responsible for technical direction and customer relations for missile activities on the RAM program.

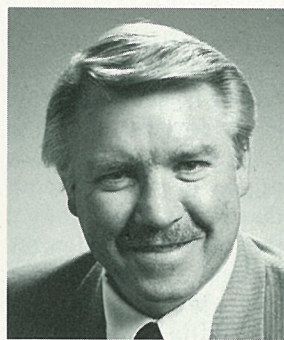
The RAM Weapon System is a fast-reaction, high-firepower missile system for defense against antiship missiles. It is being developed by Pomona under joint funding from the governments of the United States, West Germany and Denmark.

After joining Pomona in 1960 as a dynamics engineer, Lynch was promoted to engineering positions of increasing responsibility, including Design Specialist, Project Engineer and Preliminary Design Engineering Manager.

A native of Burke, S.D., Lynch, 49, earned an Associate in Arts degree in Mathematics from Mount San Antonio College, Walnut, Calif., in 1958; a Bachelor of Science degree in Mathematics and Engineering from California State Polytechnic University, Pomona, in 1960; a Master



Lynch

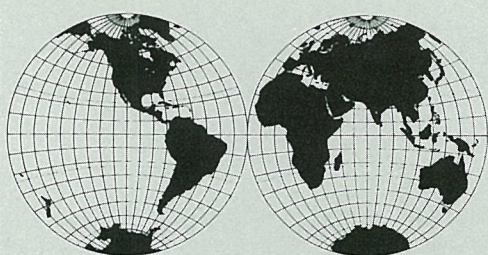


Mitchell

of Science degree in Computer Science from West Coast University in 1971 and a Master of Science degree in Engineering Management from the University of California at Los Angeles in 1979.

Mitchell joined Pomona in 1961 as an electronics engineer and held several positions, including Group Engineer, Project Engineer for Stinger Guidance and Section Head - Electro-Optical Guidance Design.

A native of Cooper, Tex., Mitchell, 48, earned a Bachelor of Science degree in Electrical Engineering from California State Polytechnic University, Pomona, in 1963 and a Master of Science degree in Management from Claremont Graduate School, Claremont, Calif., in 1979.



## Around the World

**CHQ:** Robert L. Abernathy joined as Corporate Manager-Affirmative Action Planning and Administration . . . Jeffrey D. Cerny as Corporate Huntsville Representative . . . Noel S. Goding as Corporate Manager-Casualty Insurance . . . Richard C. Gogolkiewicz as Corporate Manager-International Programs . . . Kathleen A. Roy as Subcontract Auditor . . . Steven L. Larkins as Supervising Senior Auditor . . . Karl F. Lauenstein as Corporate Manager-Legislative Affairs-International . . . George Salamon as Corporate Senior Writer . . . Mary K. Renshaw as Public Affairs Intern . . . Elizabeth D. Niehaus was promoted to Senior Corporate Financial Analyst . . . Nancy A. Porter to Corporate Consolidation Accountant . . . Bruce E. McIntosh to Corporate Graphics Supervisor . . . Thomas J. Rule to Corporate Graphics Projects Administrator.

**Fort Worth:** John W. Alden, Steven J. Rathburn and Gary N. Stevenson were promoted to Manufacturing Technology Supervisor . . . Joseph G. Bolles to Quality Assurance General Supervisor . . . Billy P. Boucher to Facilities Engineering Chief . . . Charles D. Brightwell to Support Program Management Chief . . . Roger M. Burgess to Quality Assurance Chief . . . James M. Clower to Logistics Engineer . . . Jerome P. Corbeille to Resident Office Manager . . . Don W. Davis to Quality Assurance Engineering Specialist . . . Gene C. Dawson to Assistant Project Engineer . . . Michael J. Demetz to Industrial Engineering Specialist . . . Richard L. Gerik to Foreman . . . Lester J. Hawkins to Manufacturing Technology Manager . . . Carl Hice to Senior Logistics Engineer . . . Garold E. Humfeld to Laboratory Engineering Associate . . . Michael Johnson and Sharon G. Mars to Inspection Supervisor . . . James L. Jones to Principal Field Service Engineer . . . William R. King Jr. to Manufacturing Technology Chief . . . William E. Kloster to Quality Assurance Manager . . . Robert J. Lackey to Field Service Engineer . . . David V. Mazurkevich to Configuration Control Specialist . . . E.J. Miranda to Field Supply Representative . . . Wally J. Miser to Material Program Administrator . . . Leslie W. Reagor to Manufacturing Engineering Specialist . . . Ronald A. Schroeder to Senior Manufacturing Technology Engineer . . . David R. Smith to Project Coordinator . . . Thomas J. Widunas to Quality Control Engineer . . . Beryl R. Woodman Jr. to Tooling Supervisor . . . Buddy J. Wright to Engineering Administrative Supervisor.

**Convair:** Larry W. Blaylock and Victor A. Sundfor were promoted to Group Engineer . . . Jimmy L. Pilgrim to Plant Protection Supervisor . . . Fred L. Swaffer to Travel Services Supervisor.

**Electronics:** Michael J. Lockwood was promoted to Program Coordinator . . . William J. Reddick to Superintendent.

**Pomona:** Geoffrey F. Duncan was promoted to Senior Technical Training Representative . . . Beverly J. Egger to Engineering Section Supervisor . . . David J. Gerlach to Contract Specialist . . . Everett E. Hambly and Alton J. Hitchner Jr. to Senior Project Engineer . . . Cecil E. Hope to Program Administration Manager . . . John F. Gilray and Michael A. Leone to Engineering Manager . . . Dennis J. Lomenzo and Richard J. MacNaughton to Section Head . . . Marc S. Perdew to Project Coordinator . . . Linda S. Fehn to Production Control Supervisor . . . Robert C. McDaniel and Clifford R. Piequet to Manufacturing & Material Control Chief . . . Theodore D. Hubbard II to Engineering Group Supervisor . . . Carl L. McCraw Jr. to Manufacturing Supervisor . . . Dwight G. Mitchell to Chief Engineer & Technical Director-RAM . . . Dell D. Monahan to Group Engineer.

**Electric Boat:** George Brown, Thomas Fogue and Harry Pontarelli were promoted to General Foreman . . . William Jackson and Michael Yacavone to Nuclear Ship Superintendent . . . Carl Martinoli and Earl Gifford to Engineering Supervisor . . . Michael Gaffey to Foreman . . . Gerald Mills to Engineer . . . Frederic Rogers to Assistant Superintendent . . . Paul Zerbarini to Logistics Engineer.

**Quincy:** Peter Bergeron was promoted to Manager of Compensation and Benefits . . . Robert O'Sullivan to Management Development Training Chief . . . Donna Hoke to Staff Assistant . . . Arthur Tonucci to Program Planning Supervisor . . . Michael Staid to Trade Planning Chief . . . Ronald Costa to Senior Planner . . . Richard Seiden to Industrial Engineer . . . Jean Robbins to Employee Development Representative . . . Robert Mosher to Financial Administration Chief . . . James Mitchell to Production Support Supervisor . . . Russell Tetreault, Kenneth Rusterholz, Joseph Correnti, Raymond Mailloux, Louis Baker and Gerard Grippo to General Foreman . . . Thelma Watts, Francis MacDonald, Glenn Shanahan and George Hines to Employee Development Instructors . . . Timothy Dangerfield, Mavon Jernigan, Charles Prioleau, William Jones, Kenneth Branco, Victor Ussow, Raymond Brunelli, Francis Atkinson, Robert Richard, Dana Pike, John Fallon, Thomas Aleks, Stephen Craig, Mark Cote, Dennis Lauber, Joseph Christiano, Robert Colombi, Christopher Dempsey, Walter Nester, Eric Szulak, James Willett, George Legros, Robert Niles, Phillip Raposa, Leonard Runci, Donald Faubert, Richard Lundy, Michael Keating, Kevin Dodwell, Robert Gries, Brian Johnson, Alan Talbot and Thomas Talbot to Foreman.

**Land Systems:** Dewey E. Brown was promoted to Assistant Program Manager . . . Henry E. Reiff, Tyrus R. Smith and Cynthia H. Payne to Engineering Supervisor . . . James E. McCarthy to Design Supervisor . . . Phillip Wolverton to Skilled Trades Inspection Foreman . . . Glenn R. Pierce to Guard Lieutenant . . . George W. Schrock to Guard Captain . . . Claude S. Thompson Jr. to Facilities Engineering Specialist . . . Donald R. Reiff to Facilities Planning Specialist . . . Terence J. O'Neill to Contract Administrator . . . Debora A. Morris to Senior Quality Auditor . . . Edward G. Urbanczyk to Production Engineer Supervisor.

## S. J. Pipher to Direct All Standard Missile Development Programs

Stephen J. Pipher has been appointed Chief Engineer and Technical Director-Standard Missile Programs at Pomona.

Pipher, 34, had been Engineering Manager-Missile Electronics Design. He will now be responsible for the direction of all Standard Missile development programs. Standard Missile is a surface-to-air guided missile that is the primary anti-aircraft defense system on more than 100 U.S. Navy ships.



Pipher

A native of Indianapolis, Ind., Pipher joined Pomona in 1972 as an associate engineer. He was named Electronics Engineer in 1973, Group Engineer in 1978 and Section Head-Standard Missile Guidance Group in 1981.

Pipher earned a Bachelor of Science degree in Electronic Engineering from Purdue University in 1972, a Master of Science degree in Electronic Engineering from California State University-Fullerton in 1978 and a master's degree in Engineering Management from the University of California at Los Angeles in 1981.

## L. N. Doreson Named Corporate Director, Salaried Compensation

Lawrence N. Doreson has been appointed Corporate Director-Salaried Compensation at the Corporate Office.

A native of Brooklyn, N.Y., he joined General Dynamics in 1978 after four years with the law firm of Greenfield, Davidson, Mandelstamm & Vorhees, St. Louis, where he specialized in tax and benefits law. His most recent position at General Dynamics was as Corporate Manager-Employee Benefits/SSIP & Industrial Relations Counsel.

Doreson, 35, earned a Bachelor of Arts degree from Oberlin College in 1971 and a Juris Doctor degree from Harvard University Law School in 1974.



Doreson

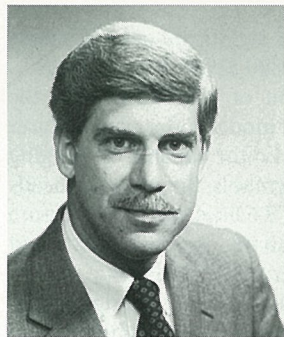
## Fort Worth Manager On Year Assignment With Head of FAA

Fort Worth employee Paul C. Leamer recently began a one-year assignment in Washington, D.C., as special assistant to the Administrator of the Federal Aviation Administration (FAA) in the President's Executive Exchange Program.

Leamer was nominated to represent General Dynamics in the program by David S. Lewis, Chairman and Chief Executive Officer. In his most recent company position, Leamer served as Manager of F-111 Pave Tack/Guided Weapons Programs.

Leamer began his assignment in the capital by attending a week-long public policy seminar, where he met with top administration officials, agency heads and members of Congress. Members of the program received briefings on current and upcoming issues and operations such as the federal budget and appropriations cycle. Leamer will continue to receive periodic briefings on domestic and foreign policy throughout the coming months.

He will be involved in program management of the agency's multibillion dollar National Airspace System Plan to upgrade air control and airway facilities. He will report directly to Donald Engen, Administrator of the FAA.



Leamer



## Fort Worth Testing Australian F-111C with Pavé Tack Avionics By Joe Stout

Flight testing of a Royal Australian Air Force F-111C modified with Pavé Tack, guided weapons and Harpoon equipment recently began at Fort Worth. The systems were installed under a program that began at the division last October.

Extensive ground testing preceded the flight test phase, which will continue at Fort Worth for four months. Before the aircraft is returned to Australia, the systems will be further evaluated in flight tests at McClellan AFB, Calif.

Thirty RAAF personnel are supporting the test aircraft in Fort Worth. Their duties include maintenance, writing procedures for modifying 19 more F-111Cs in Australia and determining spares requirements for the updated fleet. The same personnel will modify aircraft and train additional RAAF personnel in Australia.

Modification kits will be delivered to the RAAF for conversion of the additional aircraft with some initial General Dynamics support. The prototype aircraft is the only one to be modified in the United States.

The F-111C Pavé Tack modification contract, which is administered by the Strike Systems Program Office, Wright-Patterson AFB, Ohio, was received by Fort Worth in March of 1982.

The Pavé Tack pod retraction and extension concept

on the F-111 is unique. The pod mounts on a weapons bay cradle that can be rotated 180 degrees while in flight. During flight to and from a target area, the pod is stowed in the weapons bay to achieve a "clean" aerodynamic configuration. When ready for use, the cradle rotates 180 degrees to position the pod in the airstream underneath the aircraft. This allows the pod turret, which contains the infrared detection set and laser target designation system, to have a complete lower hemispherical field of view. When stowed or deployed, the pod/cradle installation imposes no limitations on aircraft maneuverability.

The Pavé Tack configuration for the F-111Cs is similar to that for U.S. Air Forces in Europe F-111Fs, using the same weapons bay cradle assembly and much common avionics equipment. The major task in adapting the F-111F Pavé Tack system to the F-111C is the development of two new avionics units and associated control panels. One of the new units permits the digital Pavé Tack system to interface with the F-111C analog bombing-navigation system. The other is required to integrate the Harpoon antiship missile with F-111C avionics.

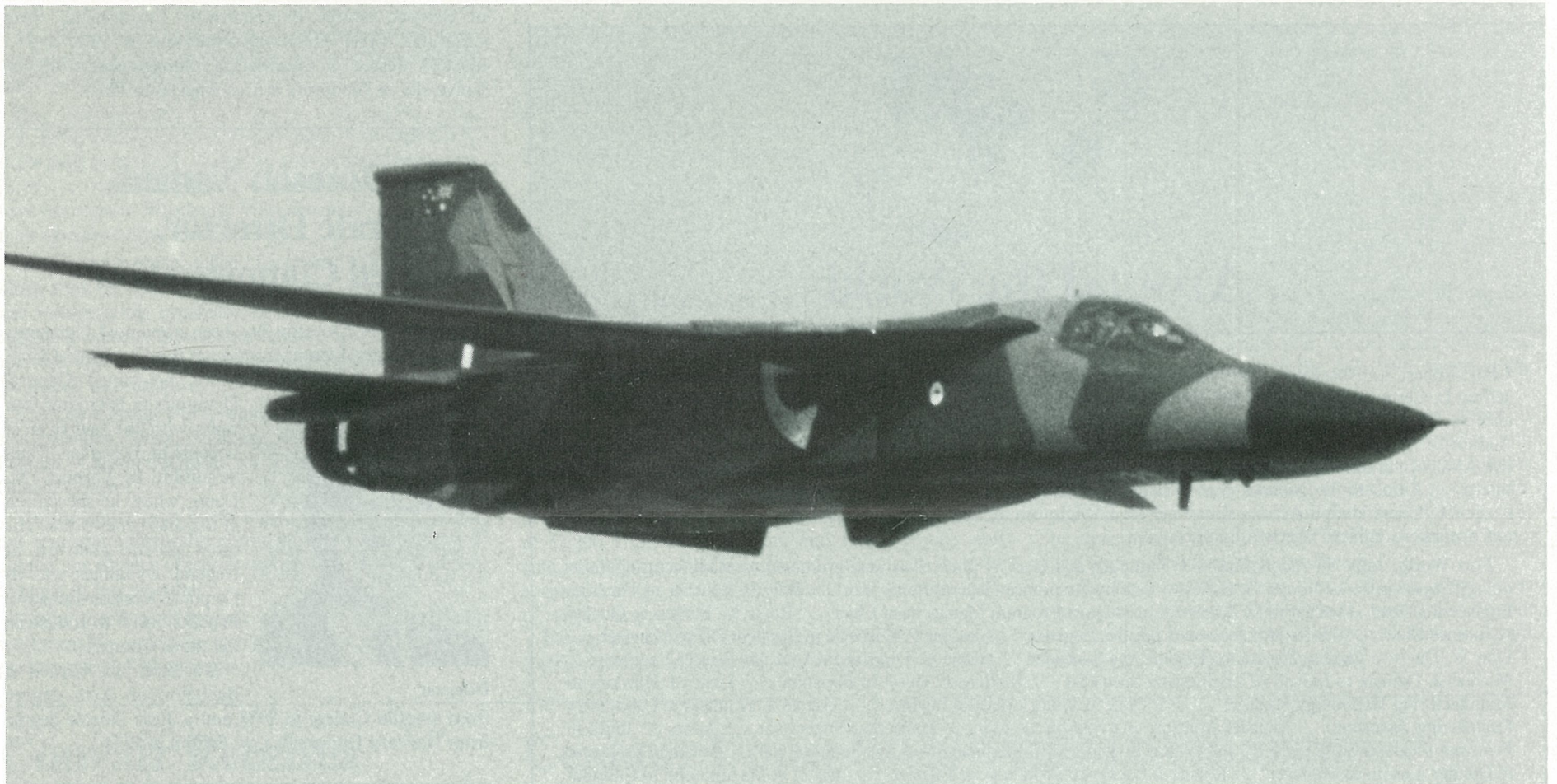
"Incorporation of the Pavé Tack and guided weapons capability into the F-111s represents a very effective

enhancement to an already potent weapons system," said Bob Reams, Fort Worth's F-111 Pavé Tack/Guided Weapons Program Manager. "The Pavé Tack/Guided Weapons system provides such precise delivery of weapons that one F-111 equipped with the system has the same target destruction potential as six aircraft without Pavé Tack equipment. In effect, the integrated system is a force multiplier. The addition of Pavé Tack/Guided Weapons to F-111Cs will provide the RAAF with a day-night precision strike capability essentially equal to that of the USAFE Pavé Tack equipped F-111Fs," he added.

Pavé Tack equipped F-111Fs have been operational at RAF Lakenheath, England, since October 1981.

The Pavé Tack pod infrared detection set provides a television-like picture on improved crew station displays, and the laser target designator is used with the set to direct a laser-guided weapon to a target. The laser system can also be used to obtain more precise navigation update information and range data for improved delivery of nonguided weapons.

The RAAF installation will permit the first use of a Harpoon radar-guided, surface-skimming missile on an F-111.



Royal Australian Air Force F-111C with Pavé Tack Modifications Being Flight Tested at Fort Worth

## DatagraphiX Offers Important Features On Laser Printers

DatagraphiX has announced significant enhancements to its line of very high-speed 9800 Series laser printers.

R. A. Steele, Vice President of Marketing, said the 9830 off-line and 9835 on-line models offer new features such as a Copy Modification Editor capable of merging variable data with graphic symbols, logos, letterheads and signatures; line densities of 9.6 lines per inch; a feature that allows two printers to share one tape drive and improved diagnostics for better maintainability.

The new line-density enhancement complements existing six, eight and 12 lines-per-inch capabilities. On the Model 9830, line densities can be changed within a page between any of the densities. A software enhancement also processes stacked files for more efficient use of magnetic tapes without operator intervention. For convenience, a power-up stacker operates in either up or down modes. Users, by sharing one tape drive, can reduce the cost of off-line tape backup.

Steele said both models offer the same standard features of the 9800 Series printers, which are capable of printing up to 21,000 lines per minute. These include the ability to print on the widest and longest paper forms; ability to print from top to bottom of a page; stations for forms overlay and splicing and small floor space requirements.

## Video Teleconferencing System Connects Corporate Office, Fort Worth, Convair

A Fort Worth employee who is visiting St. Louis to make a presentation at Corporate Headquarters discovers that he unexpectedly needs several charts and support from three coworkers back at his home division.

Meanwhile, the corporate executives who will be meeting with him decide that certain personnel at Convair would also benefit from the information he is about to deliver.

That scenario poses two problems that can be solved conveniently and cost-effectively with the freeze-frame video teleconferencing system which now links those locations. Teleconferencing is being used to supplement travel and provide a real-time, across-the-miles consultation capability among General Dynamics' aerospace operations.

Corporate Headquarters, Fort Worth and Convair have rooms equipped as teleconferencing centers. The system comprises two technologies: audio communication, accomplished with microphones and speakers placed on a standard conference table; and the video portion, which requires a camera, lectern on which system controls are mounted, color television monitor and associated electronics. Three regular telephone circuits are used: one to transmit audio signals and two to transmit color video.

The camera is positioned vertically above a document holder where charts, photographs, text, parts — anything, virtually — can be placed when their images are to be

transmitted. When a chart or object is under the camera, it appears on the television monitor at the head of the conference table. From the control lectern, the image can be transmitted to the teleconferencing rooms at the other divisions, where it will appear on their TV and lectern monitors.

The controls also make it possible to "draw" over the transmitted image in seven colors and with a variety of symbols: squares, arrows and dotted lines, among others, in addition to freehand scribing. There is also capability to erase these annotations.

The system's most effective use is with vugraph and chart presentations. Persons in locations receiving presentations can also use their own control lecterns to mark on the image they are receiving. All annotations are transmitted to the other locations instantly. While charts, graphs and drawings can be simultaneously telecast from one location to others on-line, persons taking part in the presentations are only heard, not shown.

The network's value in enhancing productivity was verified during a 60-day evaluation during which it was tested by hundreds of employees at the three divisions. Teleconferencing equipment may be installed at other company, supplier and government facilities in the future, said John Howell, Fort Worth Telecommunications Chief, who coordinated implementation of the system there.



## Interview with Dr. Alan M. Lovelace

# Quality and Productivity Are Key Companywide Efforts

**Editor's note:** As Corporate Vice President-Productivity and Quality Assurance, Dr. Alan M. Lovelace heads the General Dynamics programs in these areas. In an interview, he discusses the company's increasing emphasis on improving the quality of its products and the productivity of its operations.

**Question:** Across the corporation, we have started a drive on quality and productivity. Why are we doing this, and why are we doing it now?

Dr. Lovelace: I don't think we have started a drive. A drive has implications that a large amount of effort is going to be exerted over a short period of time, and then the effort is over and done with. On the other hand, we at General Dynamics are participating in a national change in the way American industry does things, improving the products we make and the way we make them. This isn't happening only at General Dynamics, and I think it is important for GD to show leadership in our sector of the industry.

For a number of years, American industry wasn't listening to its customers, and we faced major dislocations in

some of our most important industries when foreign industry determined high quality was a top priority for American consumers.

In the defense industry, we have always listened to our customer very closely, and quality has become a matter of increasing concern to the customer over the past few years. Though General Dynamics began working on quality and productivity some time ago, our customer is now emphasizing quality, and we are in a position to make a real impact.

**Some people say that what happened to the domestic consumer product industry, with foreign countries taking large chunks of the market away because of their high-quality products, couldn't happen to the defense industry. What do you think?**

Lovelace: We are seeing substantially more vigorous competition from overseas right now for the very business we're in. The Japanese are going to get into weapons systems; the Europeans have already carved a large market for themselves in fighter and civil aircraft, missiles and helicopters. They are formidable competitors, and I think that General Dynamics cannot afford to feel that we're in a captive relationship with our customer in a domestic

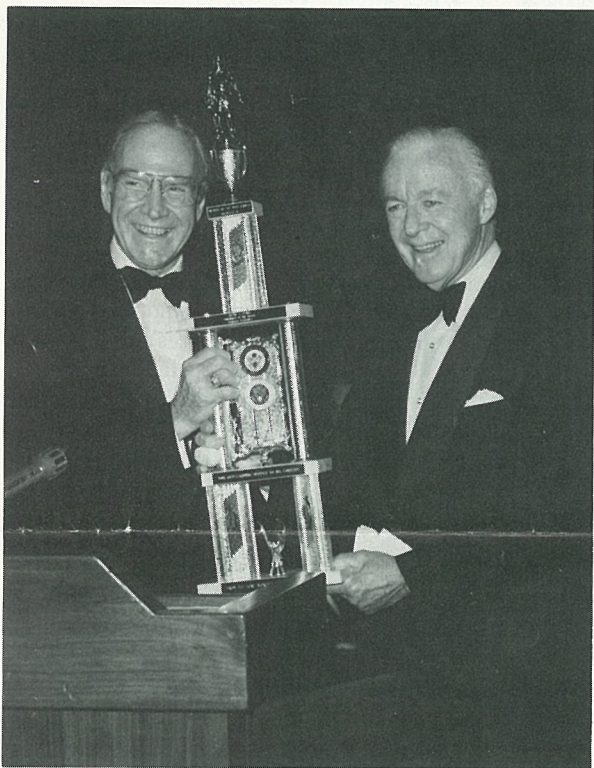
environment.

**How do you define quality and productivity?**

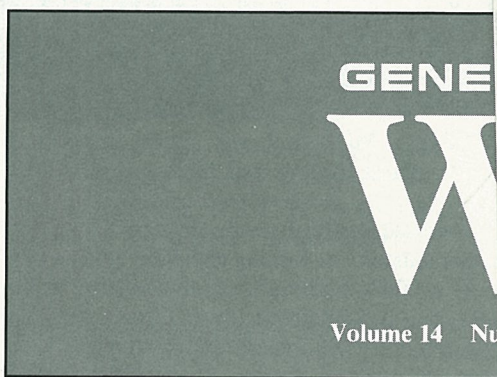
Lovelace: When we talk about quality, we tend to think about hardware. We tend not to think about the quality of our personal activities that are not directly related to the product, but those are very necessary indirect support activities. I think quality should go to the very extreme in everything we do, even to the degree of how we answer the telephone. It goes hand in hand with excellence, which is a very popular word these days. Quality means being motivated and interested in doing a good job, and that is what we're trying to achieve at General Dynamics.

Productivity, on the other hand, has many definitions covering input — labor, materials and so forth — which lead to product. Simply expressed, productivity can be defined as doing the same with less, or more with the same. Take your historical processes; there are things you can do to improve the productivity of those processes. You can modernize your manufacturing for example. Or you can rethink the whole process and make a dramatic improvement, just by being smarter. I think one of the out-

(Continued on Page 4)



**Patriot Award Presented.** United States Representative Jim Wright of Texas, House majority leader, presents the Patriot of the Year Award to David S. Lewis, General Dynamics Chairman and Chief Executive Officer, at the 1984 Fort Worth Military Ball. Lewis was cited by the Greater Fort Worth Civic Leaders Association for his "vision and leadership" in the development and production of General Dynamics' quality products.



**GENERAL DYNAMICS**  
Pierre Laclede Center, St. Louis, Missouri 63105

**Address Correction Requested**

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NOV 84

## Review of Third Quarter Achievements Reflects Steadily Improving Performance

"Aircraft, marine, missile and gun system programs set the pace in the company's third quarter results, reflecting the steadily improving performance throughout the company in 1984," according to David S. Lewis, Chairman and Chief Executive Officer.

Lewis reviewed these highlights of the third quarter in announcing sales and earnings for the period on November 1st:

- Delivery of the USS *Henry M. Jackson*, the fifth of the nation's Trident missile-firing submarines, 50 days ahead of schedule, and the launching of the *Providence*, the 19th *Los Angeles*-class fast-attack submarine to be built at Electric Boat. The *Providence* is the first ship of her class capable of vertical launch of Tomahawk cruise missiles.

- Continued on-schedule and on-cost production in the very important F-16 fighter and the M1 main battle tank programs. At the end of the third quarter, 1,257 F-16 Falcons had been delivered to U.S. and allied air forces, and 2,143 M1 Abrams tanks had been produced for the U.S. Army.

- Good progress on the Maritime Prepositioning Ship program at Quincy Shipbuilding. The keels of all five vessels have now been laid, and the first ship was floated out in early October.

- Steady growth in all production levels of missiles and gun systems at Pomona, highlighted by the 38th consecutive month of ahead-of-schedule deliveries of the

(Continued on Page 2)

## Pittsburgh Launch Set for December 8th

Electric Boat will stage its fourth launching of the year December 8th when the 688-class, fast-attack submarine *Pittsburgh* (SSN 720) slides into the Thames River at the division's Groton, Conn., shipyard.

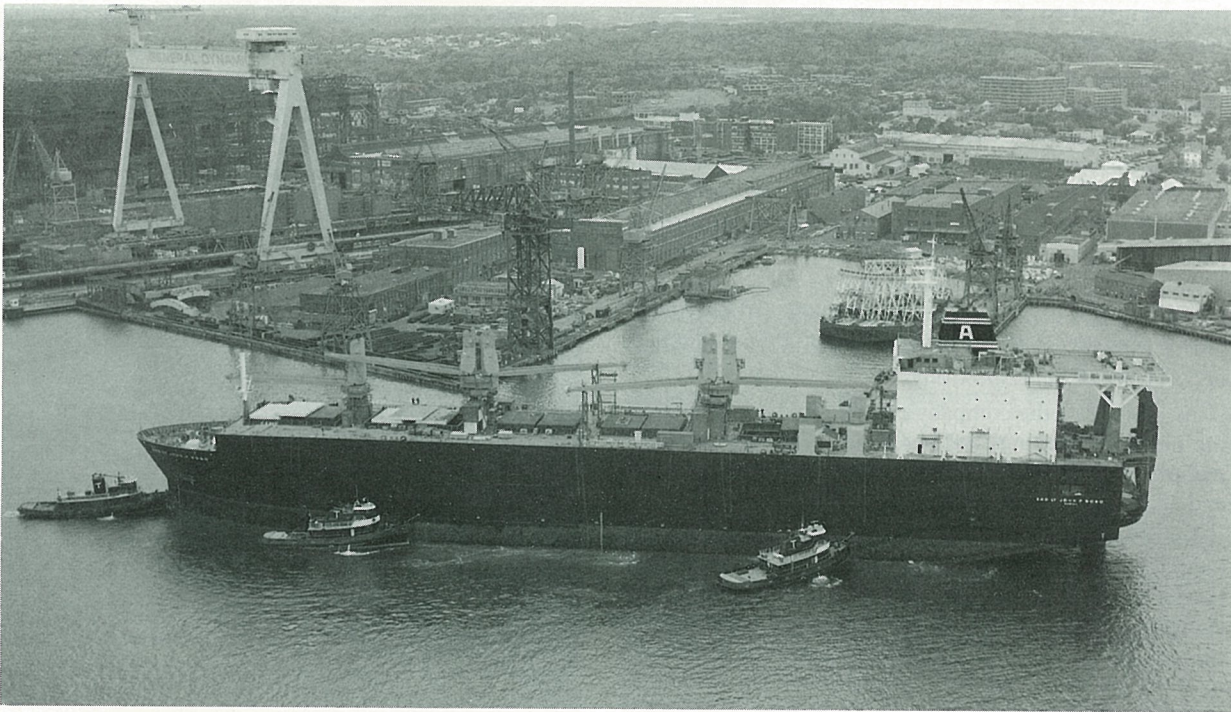
The sponsor will be Mrs. George A. Sawyer, wife of General Dynamics' Executive Vice President-Land Systems and International. Sawyer, who is former Assistant Secretary of the Navy for shipbuilding and Logistics, will deliver the principal address.

Named for the steel-producing city in Pennsylvania, *Pittsburgh* is the first submarine and the fourth U.S. naval ship to bear the name.

The first *Pittsburgh*, a sidewheel ironclad gunboat, saw action in the Civil War, while the second, an armored cruiser, participated in World War I. The third, a heavy cruiser (CA 72), earned two battle stars for World War II service in the Pacific and remained in the fleet until 1956.

*Pittsburgh* is the 20th ship of her class to be built by Electric Boat.

Other launchings this year included the sister ships *Augusta* (SSN 710) on January 21st and *Providence* (SSN 719) on August 4th. *Alabama* (SSBN 731), the nation's sixth Trident ballistic missile-firing submarine, was christened May 19th.

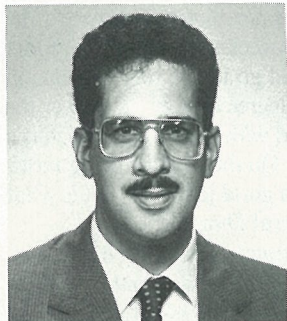


**New Ship Afloat.** The lead ship in Quincy Shipbuilding's Maritime Prepositioning Ship program was eased out of her building basin at Quincy, Mass., on October 13th. The 671-foot-long vessel, the *2nd Lt. John P. Bobo*, is one of five such ships being built by Quincy. Now being outfitted in anticipation of her christening and delivery to the Navy's Military Sealift Command, the ship bears the name of a U.S. Marine Corps hero who was posthumously awarded the Medal of Honor. The distinctive stack insignia designates the American Overseas Marine Corporation (AMSEA), a General Dynamics subsidiary which will operate the vessel while under charter to the Navy.



## Paul M. Cofoni Named Data Systems Division VP and Center Director

Paul M. Cofoni has been appointed Division Vice President and Center Director of General Dynamics Data Systems Division's Western Center, headquartered in San Diego, Calif.



Cofoni

Data Systems provides computer support for all divisions and subsidiaries of General Dynamics, including special applications software and general business and scientific software. The Western Center provides support in San Diego to Convair and Electronics divisions and to the DatagraphiX, Inc., subsidiary.

It also supports the Pomona Division's operations in California and Camden, Ark.

Cofoni, 36, has been Director of the Western Center since July 1983. Previously, he was Director of Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) at the division's headquarters in St. Louis.

Cofoni joined General Dynamics in 1974. He earned a Bachelor of Science degree in Mathematics from the University of Rhode Island in 1970.

### Savings and Stock Investment Values

Salaried	Sept. 1982	Sept. 1983	Sept. 1984
Government Bonds	\$ 3.1786	\$ 3.5559	\$ 3.8474
Diversified Portfolio	2.1060	3.1968	3.1936
Fixed Income	1.3912	1.5588	1.7510
Hourly			
Government Bonds	3.1762	3.5541	3.8445
Diversified Portfolio	2.1497	3.2628	3.2388
GD Stock	\$32.5000	\$53.6250	\$60.7500

## Third Quarter Results Reflect GD's Steadily Improved Performance

(Continued from Page 1)

Phalanx close-in ship defense system and delivery of the 500th Sparrow AIM 7M missile.

- Selection of Convair's Centaur high-energy booster for NASA's Venus Radar Mapper spacecraft. This decision brings the number of missions to be launched by Centaur from the Space Shuttle to seven. In October, Convair and Grumman Aerospace Corporation announced that they had teamed to compete for one of the prime contractor roles in NASA's Space Station Program.

- Among the company's commercial operations, Material Service experienced an excellent quarter as favorable weather in the Chicago area increased the demand for construction supplies. Freeman United Coal Mining and DatagraphiX, the leader in the computer output microfilm industry, are having their best years since 1980.

General Dynamics announced that its net earnings for the third quarter and the first nine months of 1984 were \$102.2 million, or \$2.22 per share, and \$275.7 million, or \$5.71 per share, respectively.

As a result of the company's stock purchase program, the per share earnings are based on an average of 45.6 million common shares outstanding in the third quarter and 48.3 million for the first nine months.

Net earnings are approximately 33 percent higher in the third quarter and in the nine-month period compared to the corresponding periods last year. In 1983, the company posted earnings of \$76.7 million, or \$1.43 per share, based on 53.1 million shares, and \$206.2 million, or \$3.78 per share, on 54.1 million shares, for the third quarter and nine-month periods, respectively.

Sales for the third quarter and for the first nine months this year were \$2 billion and \$5.8 billion, respectively, compared to \$1.7 billion and \$5.3 billion for the same periods in 1983. Funded backlog at the end of the 1984 third quarter was \$14.1 billion, and funded and unfunded backlog totaled \$18 billion.



**No Fear of Water.** An M1E1 tank emerges from the water at the Naval Amphibious Base, Little Creek, Va., after debarking from an amphibious assault landing craft. The tank successfully moved through water more than six feet deep to get to the shore.

## M1E1 Plows Through Water Turret High In Amphibious Compatibility Tests

A Land Systems M1E1 tank was almost turned into a submarine in recent fording tests for the U.S. Marine Corps.

The tank plowed easily through six and a half feet of water to demonstrate its fording capability during tests at the U.S. Army Tank-Automotive Command in Warren, Mich., and at Naval Amphibious Base, Little Creek, Va. The M1E1 tank also was submerged more than 20 times in fresh and salt water in a series of tests conducted by Land Systems at Warren, Mich., at Panama City, Fla., at Eglin AFB, Fla., and at Little Creek, Va.

The tests determined the effects of severe marine environment on the M1E1, proved the compatibility of the M1E1 with naval amphibious assault landing craft

and established the M1E1's fording capability.

Michael J. Morris, U.S.M.C. Program Manager, said the tests involved two tanks, each with 7,000 miles of previous testing. One was subjected to 48 hours of salt fog and to landing-craft ocean transport at 55 knots.

The second "was figuratively turned into a submarine," Morris said. "All of the tests were conducted without major incident or problem primarily because of the total commitment and teamwork among Engineering, Product Assurance, Logistics, Shop Operations and vendors."

The results of these tests will be included in the decisions the Marines will make involving procurement of M1E1 tanks.

## B-1B Is Rolled Out at Palmdale, Calif.; Electronics Division Provides Test Equipment

The first B-1B long-range strategic aircraft was rolled out recently by Rockwell International. Management and engineering officials of Electronics Division, headed by M. R. Barlow, Vice President and General Manager, were among the 1,500 Air Force and industry representatives who attended the ceremony.

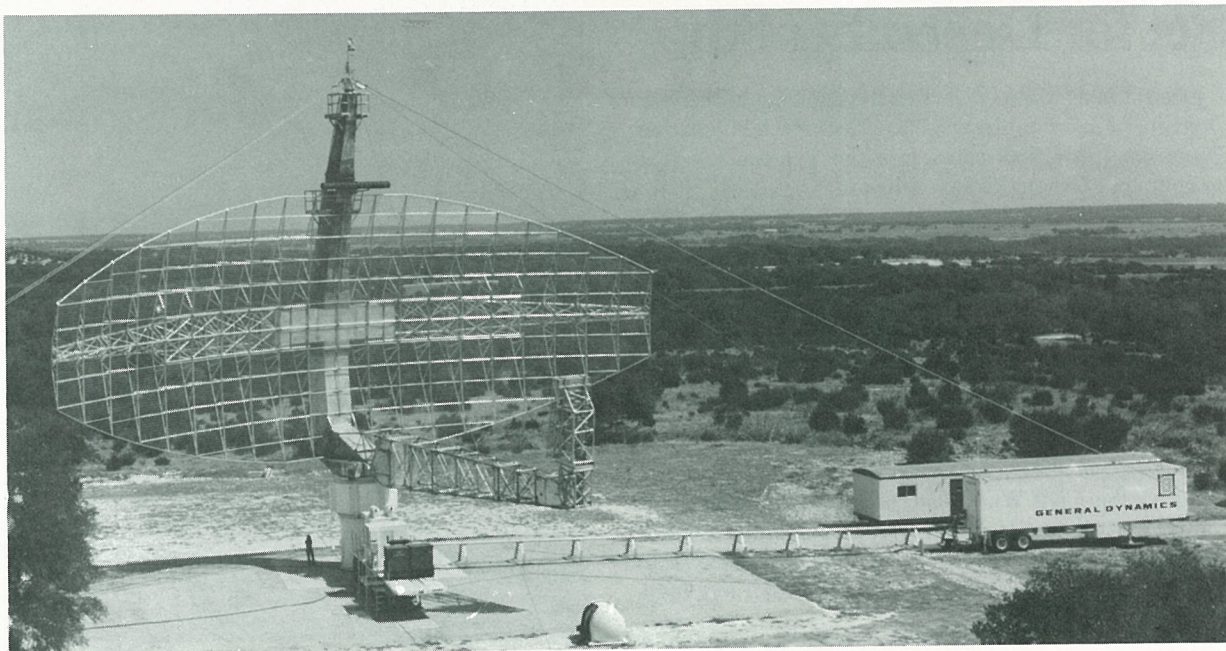
Electronics Division is a major subcontractor on the B-1B program, providing the Intermediate Automatic Test Equipment (IATE) for the offensive and defensive avionics under an initial contract of approximately \$110 million.

Electronics' contract calls for 55 IATE test stations, with first deliveries beginning in December 1984. Fourteen

Program Development Stations, used to develop the test software for the avionics, have already been delivered.

The first of 100 new bombers, which made its debut five months ahead of schedule and within predicted costs, was painted dark green and black, the new European camouflage color scheme adopted by the Air Force.

The first B-1B made its initial flight in October from Palmdale and will be flown from there to Edwards AFB, where it will begin its flight test program. Aircraft No. 9, the second plane to enter the flight test program, will also be based at Edwards, along with the three remaining B-1A prototypes.



**Impressive System.** A very high frequency instrumentation radar system designed and built by Fort Worth's Electronics Products Department is being tested at the division's antenna test range in Bosque County, Tex. The equipment was manufactured for the Massachusetts Institute of Technology, which will use it in a program to study and evaluate the effectiveness of various types of radar in aircraft surveillance and tracking. The radar system consists of a 120-foot by 45-foot antenna, a 40-foot trailer housing electronic equipment, a generator, a hydraulic antenna drive system and an office trailer.



## Construction Starts on New Computer Facility

General Dynamics has broken ground for construction of a \$13-million computer facility for the Data Systems Division.

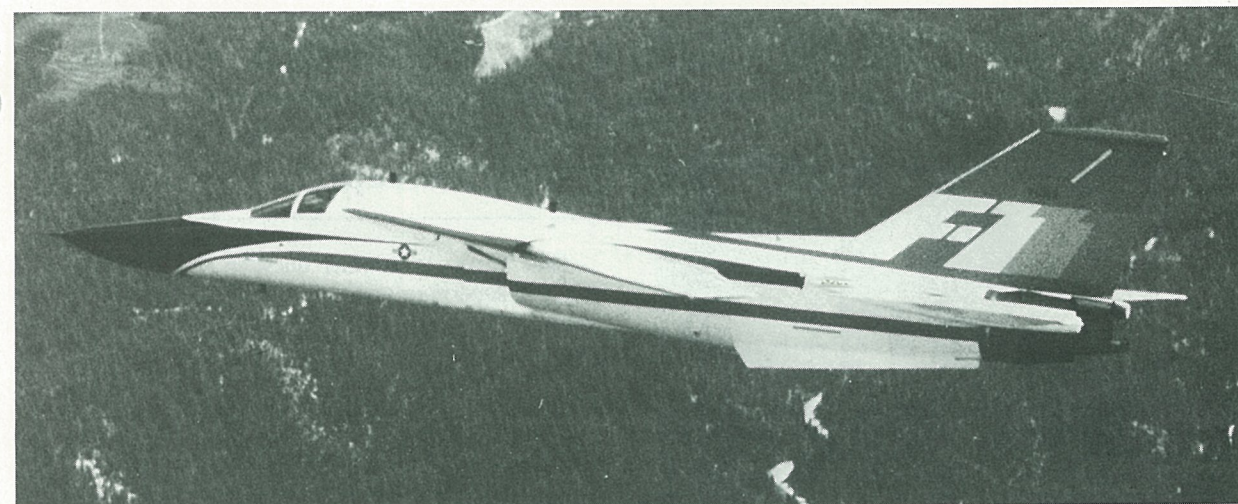
The two-story, 160,000-square-foot structure will be built on a site at the General Dynamics Kearny Mesa (Calif.) plant and will house Data Systems' Western Center computer operation as well as provide for future General Dynamics growth. Completion is scheduled for late next year.

"This new computer facility will provide for existing and planned data processing growth requirements for General Dynamics' West Coast operations over the next decade," said Paul M. Cofoni, Division Vice President

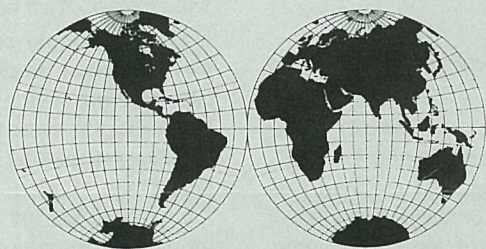
and Western Center Director, during informal ceremonies on November 2nd.

The new building will be 510 feet long with an adjacent parking area that will accommodate 600 vehicles.

Data Systems Division, which has more than 3,600 employees and is headquartered in St. Louis, provides data processing and computer-related services on a companywide basis. The Western Center develops software for complex computer-based systems and provides data processing support for the company's engineering, manufacturing, financial and other business functions at the General Dynamics Convair, Pomona and Electronics divisions and at DatagraphiX, Inc.



**Unusual Paint Scheme.** The first production FB-111, delivered from Fort Worth on Aug. 30, 1968, recently received a novel paint job. The aircraft, which was painted in camouflage when it went into operational service with the Strategic Air Command in October 1969, is being flown regularly at McClellan AFB, Calif., by the Sacramento Air Logistics Center, which had it painted white with a white and orange tail to make it more visible in flight.



## Around the World

**CHQ:** Bryan E. Koetting joined as Supervising Senior Auditor . . . Kimberly A. Clare as Documentation Specialist . . . Kevin P. Roney as Subcontract Auditor . . . Kevin C. Schubert as Software Engineer-EM/OS Processing Support . . . William M. Carroll as Internal Auditor . . . John C. Klarquist as EDP Auditor . . . Jeffrey J. Cline transferred from Data Systems Central Center and was promoted to EM/OS Communications Network Engineer . . . Julie M. Lawrence transferred from Electric Boat and was promoted to Subcontract Auditor . . . Dennis L. Arens was promoted to Traffic Engineering Manager.

**Fort Worth:** Windell S. Anderson was promoted to Contracted Construction and Work Control Manager . . . Archie R. Baker to Financial Supervisor . . . Donald E. Crittenden to Technical Reporting Analyst . . . Kevin R. Dwyer to Chief Experimental Test Pilot . . . Marvin G. Fain and James W. Potts to Technical Group Supervisor . . . Charles H. Farmer to Project Engineer . . . Fred C. Fox to Quality Assurance Chief . . . Roy D. Harrison to Inspection Supervisor . . . William H. Jones to Industrial Relations Chief . . . Charles B. Kilgore to Logistics Supervisor . . . Jennifer A. Lofton to Project Coordinator . . . Robert A. Page and Hal D. Tucker to Engineering Chief . . . Thomas B. Sheeran to Administrative Services Specialist . . . James T. Stacy to Logistics Specialist . . . William T. Stephenson to Manufacturing Technology Engineering Specialist.

**Electronics:** Melissa Richardson was promoted to Engineering Section Head.

**Convair:** Michael L. Rainey transferred from Corporate and was promoted to Senior Financial Analyst . . . Pemberton Smith transferred from Corporate and was promoted to Finance Chief . . . Larry T. Fimon and John F. Rotner were promoted to Operations Supervisor-Manufacturing Control . . . William W. Glenzer to Operations General Supervisor-Manufacturing . . . Franklin L. Henderson, Victor A. Sundfor, Arthur A. Imdieke, Jack C. Randall and Joseph D. Wallace to Group Engineer . . . Marvin E. James and Daniel T. Kuczon to Engineering Manager . . . Gary Tragesser to Engineering Chief . . . Russell Luizzi to Tooling Supervisor . . . Randall M. McPheeters to Industrial Relations Supervisor.

**Pomona:** Allen V. Calcote Jr. was promoted to Development Project Engineer . . . Robert E. Golding to Senior Quality Control Engineer . . . Vincent S. Borsattino and Paul T. Gonzalez to Plant Engineering Supervisor . . . Thomas A. Gross and Paul R. Kahler to Production Control Supervisor . . . Robert R. Navarrette to Senior Standards Laboratory Engineer . . . David M. Scott to Production Engineering Chief . . . John P. Sheahan to Procurement Chief . . . Ronald L. Turner to Inspection Supervisor . . . Kenneth J. Brown and Gary W. Burke to Group Engineer . . . Richard V. Brown to Chemist . . . Lloyd E. Forsey to Quality Assurance Project Engineer . . . Christopher A. Gribbon to Systems Analyst . . . Ronald D. Orr to Quality Assurance Manager . . . Gregory W. Ridge to Manufacturing Supervisor . . . Suwit Tapmalai to Senior Manufacturing Development Engineer. At Camden, Rodney T. Cole to General Manufacturing Supervisor . . . George W. Ragsale to Computer Systems Analyst . . . Jerry D. Poplin to Senior Quality Engineer . . . James B. Pugh to Production/Material Control Manager . . . Richard J. Zipf to Accounting Coordinator . . . Henry C. Berg Jr. to Design Specialist . . . Fred F. Ameen to Manufacturing Engineer.

**Data Systems:** At Home Office, Robert DiMaria joined as Industrial Relations Analyst . . . Kenneth L. Owen as Computer Services Specialist . . . Joseph W. Guinn was promoted to Hardware/Software Planning Manager . . . William E. Tucker to Security Manager. At Central Center, Kenneth W. Skewes Jr. to Engineering Software Chief . . . Joe R. Briones to Operations Methodology Chief . . . M. Rodney Maynard to Business Systems Development Supervisor. At Eastern Center, Warren K. Johnston to Operations Services Chief . . . Alton M. Browning to Operations Services Supervisor . . . Kenneth Packer to Teleprocessing Support Manager . . . Maureen A. Smith to Senior Software Engineer. At Western Center, Karen Swanson, Robert Eaton and Jack Crittenden to Engineering Software Supervisor . . . John Bowen to Business Systems Development Supervisor . . . Kathleen Brocki to Operations Services Supervisor.

**GDSC:** Donnie L. Peters was promoted to Product Support-Logistics Automation Manager.

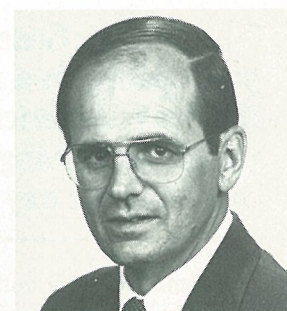
## James J. Coney Named Director of Information Resource Management

James J. Coney has been appointed to the newly established position of Director of Information Resource Management at Electronics Division.

He will be responsible for all information resource management for the division, including management information systems, EM/OS, division telecommunications and assessment and planning for these resources.

A native of New York City, he comes to Electronics from the Data Systems Division's Eastern Center, where he was Manager of Management Planning and Analysis. He joined General Dynamics in 1975 as a site analyst.

Coney, 42, received a Bachelor of Business Administration degree in Labor Management from Manhattan College in New York City in 1964.



## Suggestion Goal Surpassed By Fort Worth Employees

Fort Worth exceeded its Employee Suggestion Program savings goal for the first three quarters of this year by more than \$2 million. Documented savings totaled \$5,827,477, against a target of \$3,750,000.

The Material Department was the top savings contributor in the nine-month period with \$1,088,019. Engineering and Finance were next with \$946,769 and \$779,147, respectively.

Sub-Assembly had the highest participation, achieving 321 percent of its goal for the period. Quality Assurance was second with 262 percent, Fabrication was third with 238 percent, and Component Assembly was fourth with 174 percent.

The suggestion with the largest savings in the third quarter, \$510,789, was submitted by Wilma Psencik of Dept. 9, Revenue Management. It automates the assignment of shipment and packing sheet numbers and improves the payment cycle.

## Buyer Wins \$10,000 Award For GLCM Suggestion

Gary Klein-Wassink, a senior buyer in Convair's Procurement Department, has been awarded a \$10,000 maximum Suggestion Award for a suggestion related to the Ground Launched Cruise Missile System.

Klein-Wassink noted that the company was purchasing standard GLCM launch tube cannisters, which are highly accurate seamless aluminum tubes, and cutting them into 18-inch segments for additions to the GLCM launch tubes. The new, longer launch tubes are an outgrowth of the extensive GLCM test flights.

By procuring a less expensive rolled and welded tube from another source, Klein-Wassink has saved the company and the program more than \$151,000 on 191 parts.

## Quality Recognized

Fort Worth has been awarded a "Minuteman" plaque by the Fort Worth Headliners Club in recognition of the more than 5,500 high-quality aircraft that have been produced by the division's employees during the last 42 years.

GENERAL DYNAMICS

# World

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# Dr. Lovelace Discusses Progress of Quality, Productivity

(Continued from Page 1)

standing examples General Dynamics has is the innovations and improvements that are being made at Electric Boat in the way they build submarines. Simply stated, they went from a historical, horizontal fabrication process

**"... we at General Dynamics are participating in a national change in the way American industry does things, improving the products we make and the way we make them."**

where submarines were outfitted from the ends and by cutting holes in the sides, to a vertical fabrication process where the outfitting is performed in each section as it is manufactured. It's had rather dramatic effects on the improvement of the productivity and quality by those people who are constructing those submarines.

**Where do we stand in our industry in making quality and productivity improvements?**

Lovelace: I'd have to say that General Dynamics is probably one of the leaders. I must add, however, that we've got a lot to do. When you talk about making the changes — the cultural changes or changing the entire approach to the way we do things — in a company the size of General Dynamics, it doesn't happen overnight. We have been working on this for some time, but, as I said before, this is going to take time, it's going to take continuing work, it's going to take persistence on everyone's part.

I feel we are leaders in this, but I would expect us to be leaders. The country should expect us to be leaders. The country should expect no less from us. If we aren't willing to step forward and take up the challenge, we won't be able to maintain ourselves or our competitive position.

**In the effort, how are we as a corporation organized to tackle it?**

Lovelace: I don't have a program for productivity and quality. General Dynamics managers and workers have the program — it's up to them. Motivation must start at the top of any organization like General Dynamics. We have that from David Lewis (Chairman and Chief Executive Officer) right down the line. It has to be an on-line function, not something which is assigned to a staff function somewhere. It is either important enough to be a line function or it will be unimportant enough that we won't succeed in it. Recognizing that, we have attempted to

**"I don't have a program for productivity and quality. General Dynamics managers and workers have the program — it's up to them."**

institutionalize productivity and quality concerns as a line function at every level. We have set up a minimum number of people — something like 12 or 15 — throughout the corporation whose primary job is to help the line managers and supervisors introduce quality and productivity into their operations.

Our main direction has been to give the responsibility, the motivation, to the line people. They're the ones who are going to make the difference. For example, we have an Engineering Quality Improvement Process, which we call E-QIP, that is part of this effort. It was started by our engineers. It's run by engineers. It's for our engineers. They have had assistance from other parts of the corporation, but it is their program, they themselves have picked up the baton and said, "We're going to find ways to improve the quality and reliability of our designs. We start the process, and the basis on which we lay down the design is with the product for the rest of its life."

We have a Production Quality Improvement Process, or P-QIP, which was begun and has continued much the same way people in the production area are looking at their operations and coming up with the answers. People are training themselves. They are pitching in and really getting this thing going. There are a lot of parts to this. Take Quality Circles. We are organizing Quality Circles across the corporation, and we are seeing dramatic results. Those programs are not run from my office, they are run by line people, people with the responsibility for a function. These people are making the changes.

**Why are quality and productivity in the same program?**

Lovelace: When you think about it, you realize that quality is really the cornerstone of productivity. Obviously, we don't want to raise our productivity without producing high-quality products, and many of the things you do to increase quality will improve productivity. We don't want higher productivity without higher quality, that's why we talk about them in the same breath.



Dr. Alan M. Lovelace

**How do we measure quality and productivity? How can we tell if we're improving or not?**

Lovelace: We have established a set of measures, classical quality measures, which give us a reading. For example, if your product quality is improving, you will have less scrap, rework and repair. We monitor those and a lot of other measures which give us the idea of where we're going.

That is a management function, but as this thing grows, we're seeing that individuals and sections are beginning to come up with their own sets of measures. We really lost something in the United States called craftsmanship, a word you hear thrown around a lot, and I used to think I knew what a craftsman really was. In recent years, I changed my original definition, because I now believe that the difference between being a craftsman or craftsperson and being a worker is that a craftsperson is his or her own inspector. They know what a good product is, and they are only satisfied when it is right. They won't let it go until it is right.

That was something we lost in this country — in the automobile industry, everyone was leaving inspection to the next station down the line. It turned out that the final inspector was the customer, and that caused the industry a lot of problems. If we ask our people to be responsible for what they're doing, we had better listen to them when they come up with suggestions. We as management might think we understand what is involved with their job, but every day they have to make out a form, answer the telephone, machine a part or assemble parts. Don't you think they might have some ideas about how to improve the job? You'd better believe they do. The last 20 years, we simply have not been listening to people's ideas. We told them, "Go do your job . . . I hired you to machine those parts, and I want 20 of those parts this afternoon . . . don't waste time telling me how to do it better. You just run the machine. . . ." That attitude has to go, it's got to be replaced.

**Are you talking about General Dynamics or American business in general?**

Lovelace: I'm talking about American industry, and I'm talking about GD. We haven't been a great listening post to pick up good ideas, and if we're going to improve quality and productivity, most of the good ideas will come from the people doing the job. I hope we're getting better at it; I hope we're getting people involved in solving the problems we have, and I hope we're providing them the tools and training they need to do a better job. We have a long way to go. But our intentions are good, and our direction is proper. Management, from the top down to the supervisor, is going to have to encourage and continue the process. But as I say, we've got a long way to go.

**"... the difference between being a craftsman or craftsperson and being a worker is that the craftsperson is his or her own inspector."**

**That brings up another question: Imagine yourself a first-line supervisor and you and your people are facing a choice between quality and schedule. Which do you choose?**

Lovelace: Quality. And I realize that's not easy. It's easy for me to say, but when you're on the line, and you blow a whistle, and say, "Wait a minute. That operation needs to be corrected or changed," there will be problems. But you've got to do it. You're going to face a lot of pressures, but that is what it's all about. The fact is that each of us, first-line supervisors and their people on up, has an obligation and responsibility to put quality and productivity as Number One. If we as a corporation do that, if we as a nation do that, we will find that our costs are going to go down, costs of scrap and rework will fall, and eventually the product cost will fall and the customers' satisfaction will increase. It's a hard thing to do, but we've got to do it.

**Okay, an employee sees a better way to handle his job, a way to increase productivity or quality. Since productivity can mean producing the same with less, cannot that mean producing the same with fewer employees? Might not an employee suggesting a better way to do a job be suggesting himself out of a job?**

Lovelace: Let me approach that this way: What is our motivation to reduce costs? The motivation is that if we don't, and we also don't negotiate a new contract with our customer based on reduced costs, then we might find that the customer has gone somewhere else. So competition is our first motivation. And that should be the motivation of all of our employees.

**"If we ask our people to be responsible for what they're doing, we better listen to them when they come up with suggestions."**

Technology is moving into many, many areas and many, many work places. New technology, robotics for one, can appear threatening to our employees, because it seems that we are replacing employees with machines. What we have to do is provide those employees with more efficient machines to do the job. This change will create additional jobs, jobs for which many workers will have innate capabilities to perform and to perform well. This may take education or cross training, but if we are going to advance as a corporation and remain competitive, we all have to face those problems. If we do reduce our costs, there is the very real possibility that the market will increase, because if we are producing the same for less, the customer will want to buy more. The net consequence to our workforce may be that job security will improve and the total workforce may increase.

## Army Awards Contract For Stinger Improvement

Pomona has been awarded a \$35,500,000 contract for engineering development of a reprogrammable microprocessor for the Stinger Weapon System.

The 39-month contract, awarded by the U.S. Army Missile Command, calls for development, testing and preparation for future production of this improvement to the shoulder-fired Stinger air defense system.

Stinger, designed for quick reaction, provides immediate air defense and is deployed with the U.S. Army, U.S. Air Force and U.S. Marine Corps. It has been in production at Pomona since 1979.

## DatagraphiX Announces New Management Recorder

DatagraphiX has announced the Mini-AutoCOM Model III computer output management recorder.

R. A. Steele, Vice President of Marketing, said, "The system's simplicity of operation and the flexibility of its minicomputer control are now augmented by an IBM personal computer. The personal computer offers operator interface, message display and diskette storage features for added convenience and versatility to computer output management."

Steele said the personal computer enhancement establishes an additional method of loading microfilm-reformatting control information to the system and allowing concurrent setup and job processing. Functions

such as job accounting files may also be set up on the personal computer. Current equipment status is monitored and communicated to the operator through a series of easily understood, programmed messages.

Through its high-speed minicomputer, the Mini-AutoCOM Model III accepts virtually any print image of COM-formatted tape, eliminating the need for host computer data handling and reformatting, Steele said. Modular, solid-state circuitry and a unique microprocessor further improve system performance, creating tangible savings in the retrieval of computer output.

Engineered for simplicity, the minicomputer-controlled AutoCOM recorder offers total system compatibility and can be installed in any normal office environment.



# Season's Greetings

Fellow Employees:

The holiday season is an important time for all of us, as families and friends, to take the opportunity to grow closer and share in the special feelings of the season. I would like to personally thank all of you in our extended family for your dedication and loyalty to General Dynamics, which served to make 1984 a very successful year.

As we look ahead, the coming year promises to be even better. Your continued contributions will again be the single most important factor in our success. We should all be proud of the fine work of our people and the excellent reputation for high quality products General Dynamics has with its customers.

It would be imprudent, however, to ignore that the defense industry, and General Dynamics in particular, has been subjected to a difficult period of unfair media treatment.

I want you to know that your management team and the board are taking this

treatment very seriously, and we are determined to move ahead aggressively with renewed vigor in our communications efforts. We are committed to taking every appropriate action to counter these media assaults — for the future well-being of each of you and our company as well.

I have every confidence that General Dynamics will remain a leader in developing and producing the best systems technologies in the world — helping to keep our world at peace.

Your continued support is vital as we enter a New Year of greater achievement.

My very best personal wishes to you and your families for a happy Holiday Season.

*D.S. Lewis*

## Mrs. Carol H. Sawyer Christens Pittsburgh In EB Ceremony

Electric Boat's performance in the timely production of 688-class, fast-attack submarines continued December 8th when the *Pittsburgh* was launched at the Groton, Conn., shipyard.

The *Pittsburgh* (SSN 720) is the most nearly complete 688-class submarine built by the division so far, thus ensuring her early delivery next year and the continuation of the division's momentum in the scheduled delivery of ships in her class.

*Pittsburgh* is the 20th ship of the 688-class to be built by Electric Boat, and she is the first submarine to be named for the steel-producing city in Pennsylvania.

George A. Sawyer, General Dynamics' Executive Vice President-Land Systems and International, was the principal speaker at the launching. His wife, Mrs. Carol H. Sawyer, christened the ship.

Sawyer, who is former Assistant Secretary of the Navy for Shipbuilding and Logistics, told about 3,000 guests and spectators that America has renewed its spirit and pride in its armed forces and is rebuilding its fleet "because the nation wants it."

He called the Navy "a mirror of our society as a whole. This renewed Navy, renewed in both physical and human resources, could come into being only with the support of the nation."

"Our hope and prayer today," Sawyer continued, "must be that this *Pittsburgh* will carry on the traditions of service and excellence, but never in her lifetime experience the need to use her great powers in war."

Sawyer said that strength through deterrence has been "a fundamental precept of this (the Reagan) administration and the rationale for the major naval restoration program that began in 1981." Referring to the "600-ship" Navy, he called the program "much more than simple numbers or solely ship construction" and said that "the nation and its leadership can look back with the pride of accomplishment" that the 600-ship Navy will be reality by the end of this decade.

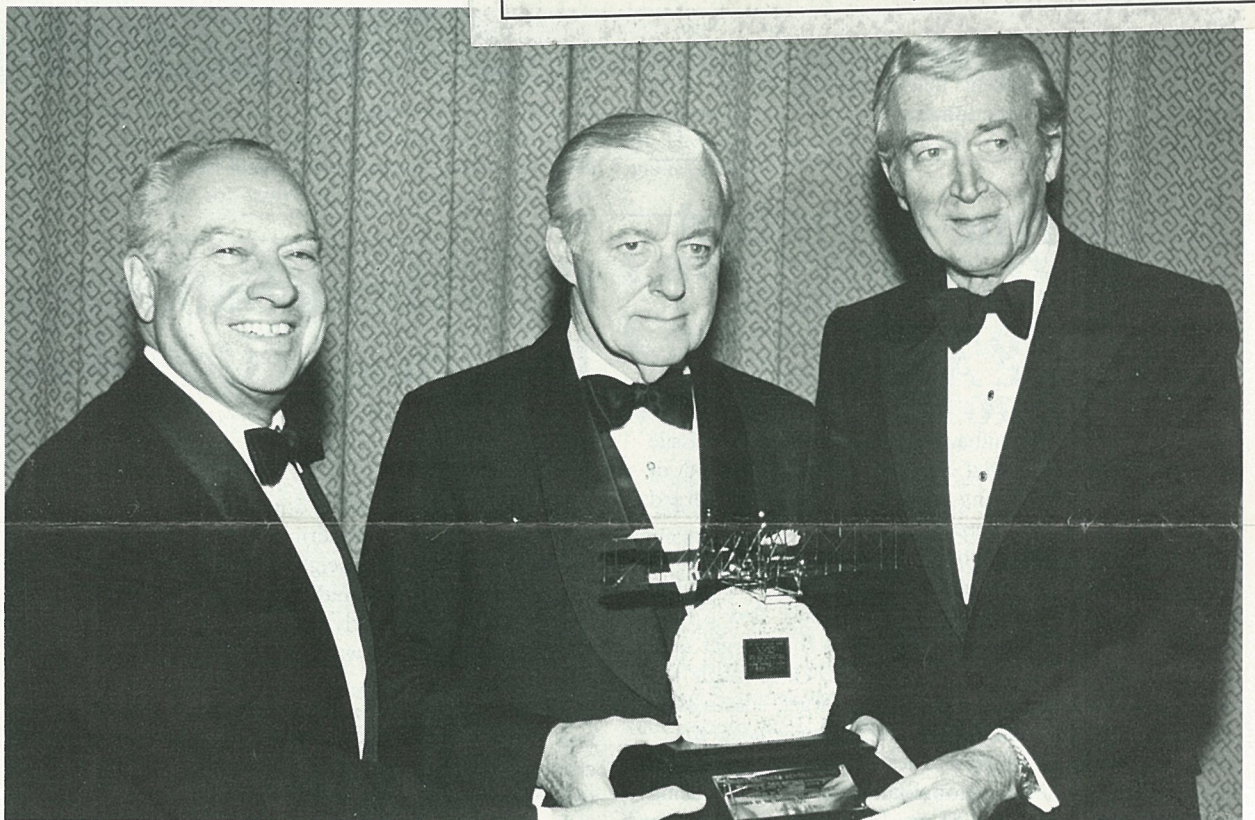
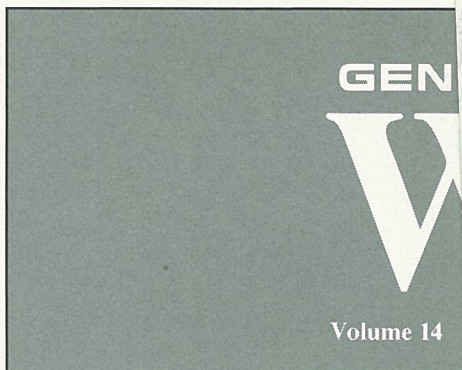


Mrs. Sawyer Christens the *Pittsburgh*

After his address, Sawyer relinquished the spotlight to his wife, sponsor of the *Pittsburgh*. "I christen thee *Pittsburgh*. May God bless her and all who sail in her," Mrs. Sawyer said. She then cracked a bottle of champagne on the bow of the ship.

Halfway down the port side of the ship, standing in the trigger pit next to the building ways, Third Shift Superintendent Stanley Peckham, a veteran of 32 years at Electric Boat, shoved forward the trigger that released *Pittsburgh* for her trip into the Thames River.

(Continued on Page 2)



**Trophy Presented.** The Wright Brothers Memorial Trophy for 1984 was awarded by the National Aeronautic Association to General Dynamics Chairman David S. Lewis (center) at the annual Wright Memorial Dinner in Washington, D.C., December 7th. The trophy was presented jointly by Maj. Gen. Clifton F. von Kann, U.S. Army (Ret.), President of the NAA (left), and Brig. Gen. James M. Stewart, U.S. Air Force (Ret.).

## Wright Brothers Award Honors Lewis For His Contributions to Military Aviation

David S. Lewis, Chairman and Chief Executive Officer of General Dynamics, on December 7th received the prestigious Wright Brothers Memorial Trophy for 1984 and was praised as an outstanding representative of the aerospace industry.

The presentation of the award by the National Aeronautic Association (NAA) was made at the 37th annual Wright Memorial Dinner in Washington, D.C.

The trophy, a silver model of the original Wright brothers' airplane, honors outstanding aviation figures for their "significant public service of enduring value to aviation in the United States."

Lewis was cited "for his lifetime contributions to military aviation and national defense and his untiring efforts in the design, development and production of superior combat aircraft."

The presentation was made by Maj. Gen. Clifton F. von Kann, U.S. Army (Ret.), President of the NAA, and Brig. Gen. James M. Stewart, U.S. Air Force (Ret.).

General Stewart told an audience of about 1,100 persons, that Lewis, as a senior executive of the McDonnell Douglas Corporation and of General Dynamics, made major contributions in providing the U.S. and its allies with the McDonnell F-4 Phantom II and the General Dynamics F-16.

General von Kann praised Lewis as an outstanding representative of the aerospace industry and said he had the same characteristics as the Wright brothers — "vision,

courage, determination and a faultless life."

In accepting the trophy, Lewis said: "The Wright brothers' long and strenuous efforts to attain powered flight is probably the best known story of any major technological accomplishment in history. I would guess that the opinions of most people who have heard it would be that those special men had worked beyond themselves to overcome successfully the enormous challenges that faced them in their very great beginning."

"Since those early days, aviation progress never ceased to provide supreme challenges to the generations of designers that followed those pioneers."

"Over the last 40 years, nothing has changed. Each semigeneration of engineers has been faced by national defense pressures, and by the extremely competitive forces in general aviation and in commercial transport. And their successes still change our world."

"It has been my good fortune to spend my business life in the wonderful world of aviation for 45 of the 81 years since the Wright brothers made history at Kitty Hawk."

"I have been most fortunate to work with many superb people. We were always challenged to the roots of our knowledge and creativity and, looking back on our efforts for three great companies — Martin, McDonnell Douglas and General Dynamics — there were some really fine

(Continued on Page 2)



# Greece Announces Selection of F-16 As New Fighter

The government of Greece recently announced that it has selected the F-16 to be a future fighter of the Hellenic Air Force.

The version to be procured by Greece incorporates some unique features that have been requested by that country. Greece will purchase 40 F-16s and 40 French-made Mirage 2000s concurrently.

The Greek Government also said it may buy 20 additional aircraft from one of the two suppliers at a later date.

Herbert F. Rogers, Vice President and Fort Worth General Manager, said, "We are very pleased that the F-16 has been selected to meet the very demanding defense requirements of Greece. This has been a long and difficult competition — approximately four years — and many of our employees have been involved in this winning effort. I congratulate them all for another job well done."

Greece will become the 12th nation to operate the multimission F-16.

F-16s will be sold to Greece under slightly different ground rules than to some of the countries that have purchased the aircraft previously, since this procurement will be termed a "direct" sale rather than a government-to-government foreign military sale.

Rogers said this and the design aspects of the Greek configuration will present new challenges to the F-16 development and production team.

# Submarine-Launched Tomahawk Displays Guidance Accuracy

A Convair-built Tomahawk sea launched cruise missile successfully demonstrated its terminal dive method of attack recently after being launched from a submerged submarine off the Southern California coast.

Seconds after launch, the unarmed conventional land attack cruise missile broached the surface of the water, transitioned from boost to cruise flight and flew a fully guided mission of more than 400 miles to a target area at the Tonapah Test Range in Nevada. Once inside the range, the Tomahawk hit a simulated target, successfully demonstrating the missile's terminal guidance accuracy.

The test was another in a series of developmental tests of the Tomahawk conventional land attack missile using the terminal dive method of attack, which increases the missile's effectiveness against a wider range of targets located closer to the ground. This Tomahawk variant is scheduled for deployment aboard surface ships and submarines in 1986.

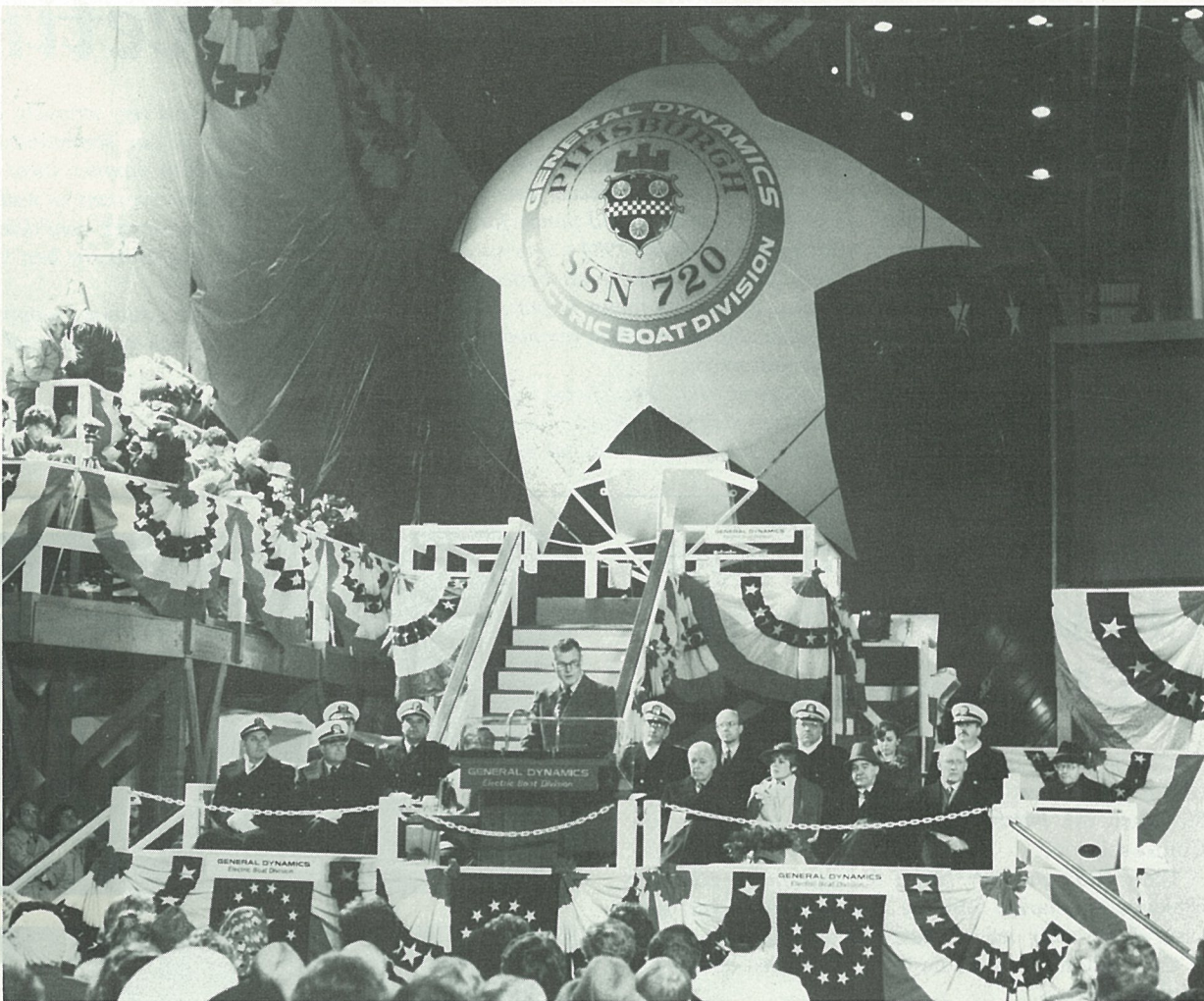
Convair is producing the Tomahawk family of cruise missiles for the U.S. Navy and the U.S. Air Force under direction of the Joint Cruise Missile Project.

# First F-16C and F-16D Delivered to Luke AFB

The first F-16C and F-16D assigned to the U.S. Air Force Tactical Air Command have been formally delivered to the 58th Tactical Fighter Training Wing at Luke AFB, Ariz.

The aircraft were turned over to the wing's 312th Aircraft Maintenance Unit, which was activated recently to support the 312th Tactical Fighter Training Squadron. The 312th TFTS will begin F-16C/D pilot training early next year.

Savings and Stock Investment Values			
Salaried	Oct. 1982	Oct. 1983	Oct. 1984
Government Bonds	\$ 3.2826	\$ 3.5780	\$ 3.9040
Diversified Portfolio	2.4013	3.1048	3.2359
Fixed Income	1.4043	1.5739	1.7684
Hourly			
Government Bonds	3.2806	3.5762	3.9014
Diversified Portfolio	2.4517	3.1678	3.2842
GD Stock	\$32.7500	\$54.5000	\$64.2500



**Ready for Christening.** The fast-attack submarine *Pittsburgh* rests on the building ways ready for her launching at Electric Boat's Groton, Conn., shipyard. George A. Sawyer, General Dynamics Executive Vice President-Land Systems and International (at podium), was the principal speaker. Sawyer, former Assistant Secretary of the Navy for Shipbuilding and Logistics, spoke to about 3,000 spectators at the event.

# Fast-Attack Submarine Pittsburgh Launched in Ceremony at Electric Boat

(Continued from Page 1)

*Pittsburgh* began sliding down the ways to the strains of the Navy Northeastern Band's rendition of the traditional "Anchors Aweigh" mixed with the shrill blast of the ship's whistle. Gathering speed, she burst stern-first into a brilliant early morning sunlight and plunged into the wind-whipped water to the cheers of the thousands of onlookers.

Earlier in the ceremonies, Fritz G. Tovar, Vice President and Electric Boat General Manager, had welcomed the crowd with the message that the division plans to keep up timely delivery of submarines. "Two other ships of this class have been delivered to the Navy this year along with two Tridents," Tovar said, "and we at Electric Boat intend to keep up this momentum."

David S. Lewis, General Dynamics' Chairman and Chief Executive Officer, reported that *Pittsburgh* was being launched as the most nearly complete 688-class

submarine built by the division, "thus insuring that it will be another high-quality submarine delivered to the Navy ahead of very demanding schedules."

Introducing Sawyer at the ceremonies was Chapman B. Cox, General Counsel of the Department of Defense. Cox praised the submarines and the company. "Your product — these 688-class submarines — are the best in the world," he said. "And your leadership is also the best."

Representing the city of Pittsburgh was Richard A. Halleran, President of the Navy League of the United States - Pittsburgh Council. His wife, Judy, was Matron of Honor for Mrs. Sawyer at the ceremonies.

The launching was the fourth this year at the shipyard. *Augusta* (SSN 710) and *Providence* (SSN 719), sister ships of the *Pittsburgh*, were launched on January 21st and August 4th, respectively, while *Alabama* (SSBN 731), the sixth Trident missile-firing submarine, was christened May 19th.

# Lewis Receives 1984 Wright Brothers Trophy

(Continued from Page 1)

and successful aircraft programs carried out in support of our nation and of the Free World's commercial airlines."

The dinner was hosted by the Aero Club of Washington, a chapter of the NAA. ABC News Anchorman Steve Bell was master of ceremonies for the event.

Lewis began his career in aviation as an aerodynamicist with the Glenn L. Martin Company in 1939 after receiving a degree in aeronautical engineering from the Georgia Institute of Technology.

In 1946, he joined the McDonnell Aircraft Corporation as Chief of Aerodynamics. In 1952, he became Chief of Preliminary Design, and in this position he was the leader of the small team of engineers who originally conceived, designed and sold the F-4 to the Navy. After this program was well under way, he demonstrated his broadened management capabilities as Project Manager of the F3H Demon Program and, later, the F-101 Voodoo Program. In 1957, Lewis was named Vice President of Project Management and, subsequently, he became Senior Vice President of Operations, Executive Vice President, and, in 1962, he was appointed to serve as President and Chief Operating Officer of McDonnell Aircraft Corporation.

Lewis continued to be closely associated with the development and production of the F-4, one of the most versatile and successful jet fighters in history. Contracts with the United States Navy and the United States Air

Force and with several U.S. allies led to eventual production of more than 5,000 Phantoms.

In 1967, when McDonnell merged with the Douglas Aircraft Company, Lewis was named President and Chief Operating Officer of the McDonnell Douglas Corporation.

In October 1970, Lewis became Chairman and Chief Executive Officer of General Dynamics. From its inception, he was intimately involved with the design, development and production of the F-16.

He took a great personal interest in the activities of the advanced design team assigned to the Light Weight Fighter competition and made specific contributions to the aircraft design. He also directed the implementation of the highly successful multinational coproduction program under which high quality F-16s continue to be produced on time and on budget.

In 1975, Lewis and the USAF/Industry team which produced the F-16 were awarded the Robert J. Collier Trophy "for the greatest achievement in aeronautics or astronautics in America."

The list of previous recipients of the Wright Brothers Memorial Trophy includes Charles A. Lindbergh, Lt. Gen. James H. Doolittle, Sen. Barry M. Goldwater, Clarence L. "Kelly" Johnson, Dr. Theodore von Karman, Donald W. Douglas Sr., Igor I. Sikorsky, William M. Allen, Juan Terry Trippe and other distinguished aviation pacesetters.



# GD, Grumman Select Subcontractors for Space Station

General Dynamics and Grumman Aerospace Corporation, competing together for one of the prime contractor roles in NASA's Space Station Program, have announced selection of seven major subcontractors.

The seven subcontractors are: Hamilton Standard and Life Systems Inc., which will conduct studies for the environmental control and life support system; Ford Aerospace, which will be responsible for data management and communications systems; TRW, which will define orbital maneuvering vehicle accommodation requirements; Ball Aerospace, which will focus on science module requirements; Computer Sciences Corporation, which will be responsible for applications software, ground communications and data systems, and Otha C. Jean and Associates, which will concentrate on customer accommodations and ground operations.

General Dynamics will also draw upon the experience of Electric Boat to augment life support, crew habitability, packaging, logistics and maintainability aspects.

The Space Station Program team is centered at Convair in San Diego, Calif., and Convair recently completed a mock-up of the Space Station as a manufacturing and technology laboratory.

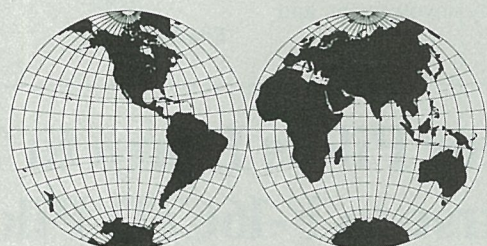
The combined General Dynamics-Grumman effort is headed by William F. Rector, Vice President-Space Station Program.

As team leader, General Dynamics is responsible for overall system integration, while Grumman will focus on laboratory outfitting and thermal systems.

The team recently submitted its proposal to the NASA Marshall Space Flight Center for a space station work package. The package includes definition and preliminary design of pressurized common modules to be configured for habitability, science experiments, materials processing, manufacturing in space and logistics support.



**General Dynamics/Grumman Mock-Up.** This recently completed mock-up at Convair shows the configuration of the Space Station as a manufacturing and technology laboratory. The common module concept of the Space Station will be used for science experiments, habitability and logistics support.



## Around the World

**CHQ:** George E. Johnson joined as Corporate Office Telecommunications Manager . . . Sally E. Bub as International Staff Accountant . . . Nanci G. Cole as Financial Analyst . . . Matthew W. Orvick as Internal Auditor . . . George Schumacher Jr. transferred from Convair and was promoted to Corporate San Bernardino Representative.

**Fort Worth:** Thomas D. Arber was promoted to Material Planning Chief . . . Terry Austin to Project Coordinator . . . Floyd A. Ballard and Rollin N. Munger to Logistics Group Supervisor . . . Richard D. Barrett to Material Stores Supervisor . . . Billy D. Boggs to Administrative Assistant . . . Gus W. Brooks III to Logistics Engineer . . . Michael B. Busby and William D. Loomis to Material Planning Supervisor . . . Thomas H. Clark to Project Manager . . . C. Lewis Dickey to Support Equipment Manager . . . Rebecca G. Ellis to Senior Logistics Administrative Analyst . . . Daniel C. Gilmore and Billy D. Jackson to Financial Supervisor . . . Roger D. Harrison to Senior Procurement Planner . . . James E. Howe and Lloyd A. Huff to Engineering Chief . . . Charles E. Ince III to Industrial Engineering Supervisor . . . Keith Lane and Millard T. Smith to Engineering Administrative Group Supervisor . . . Terri S. Larson to Logistics Management Systems Specialist . . . Ray D. Leach to Principal Field Service Engineer . . . John D. Lobban to Financial Chief . . . Clarence R. Nowosatka, Gary C. Stephens and Billy C. Weaver to Technical Group Supervisor . . . James B. Roach II to Planning Specialist . . . Edwin P. Vonkohn to Logistics Group Engineer.

**Convair:** Gordon M. Dickinson was promoted to Operations Supervisor-Manufacturing Engineering . . . Kenneth L. Higgins, Luis B. Miranda and Brooks E. Spence to Quality Assurance Supervisor . . . Gerald T. LaBranche to Engineering Lab Supervisor . . . Kenneth L. Nauta, David L. Walker, William F. Wennhold and Robert E. Drowns to Engineering Chief . . . Sidney C. Jones and Randall K. Simpson to Engineering Director.

**Electronics:** Moses Yarmus was promoted to Senior Project Manager.

**Electric Boat:** Richard Armstrong and Dennis Garrison were promoted to Nuclear Test Supervisor . . . George Brown and Michael Mercier to General Foreman . . . George Chapman to Engineering Associate . . . Denis Jewett to Engineering Manager . . . Frederick Keith to Nuclear Project Manager-Trident/S8G . . . John Leonard to Project Financial Analyst . . . Frank Mayo and Lawrence Patty to Engineering Chief . . . Russell Perry to Foreman . . . Philip Shurmester to Senior Engineering Assistant . . . Donald Slawski to Engineering Supervisor . . . Donald Wittig to Senior Test Operating Engineer.

**Pomona:** Mary Chesus, John S. Jensen, Lucinda M. Johnson, Alice A. Jones and Victor P. Plescia were promoted to Cost Control Chief . . . Richard Ferraro to Project Representative . . . Charles E. Frazier to Manufacturing Development Specialist . . . Gerald G. Gardner to Professional Staffing Supervisor . . . Gary R. Hawes to Technical Data Management Representative . . . Harvey F. Richt and Mark R. Roberts to Assistant Project Engineer . . . Eunice M. Ulloa to Engineering Group Supervisor . . . Sandra J. Woolsey to Manufacturing Engineer . . . Robert D. Crawford to Electronics Engineer . . . Milton E. Erskin to Pre-Manufacturing Engineering Chief . . . Duane P. Gooden to Group Engineer . . . Dave W. Holmes to Senior Staff Engineer . . . Kenneth H. Hui to Section Head . . . Joseph A. Mecca Jr. to Project Coordinator . . . George A. Metcalf to Project Administrator . . . Terri L. Vinatieri to Manufacturing Supervisor. At Camden, Kenneth N. Anders to Quality Assurance Chief . . . Carl W. Mosby to Quality Assurance Supervisor.

**Land Systems:** Frederick J. Hiller was promoted to Engineering Program Management Chief . . . Said B. Samaan to Group Engineer . . . Juan Borges to Logistics Engineer . . . David Jaissle to Financial Specialist . . . Joseph D. Klesko to Senior Engineering Assistant . . . Edna F. Ciaravino to Program Management Analyst . . . Roger D. Locke and Alfred D. Farrell to Design Supervisor . . . Samuel G. Kimmons to Production Planning & Control Supervisor . . . Daniel R. McKercher to Inspection General Foreman . . . Jessie R. Davis to Production Control General Supervisor . . . Michael A. Puzzoli to Quality Assurance Chief . . . Michael S. Trigilio to General Foreman . . . Karl G. Oskoian to Industrial Relations Manager . . . Beatrice Hamor to Environmental Control Chief . . . Donald J. Reinhold to Quality Assurance Engineering Specialist.

**GDSC:** Joseph W. Grueneberg was promoted to Project Manager-Fort Irwin . . . Donnie E. Brown to Flightline Branch Leader . . . Roger K. Brandon to Quality Assurance Branch Leader.

## Land Systems Wins Contract for Advanced Vehicle Electronics

Land Systems has been awarded a contract to develop an advanced Vehicle Architecture and Demonstrator for application in future combat vehicles.

The contract work will be performed by the Vetronics Laboratory of the Engineering Laboratories at the Troy Technology Center, with support provided by the Fort Worth, Electronics and Data Systems divisions.

Land Systems was one of four bidders of 13 awarded a contract by the U.S. Army Tank-Automotive Command in the field of vetronics (vehicle electronics).

During the 24-month program, Land Systems will develop an advanced electronic systems network for combat vehicles to handle the increasing need for such data communication among vehicle subsystems as fire control, stores management, navigation, communications, automotive, countermeasures and electrical power management.

The proposed network will be made up of a multiple data bus configuration to accommodate video, audio, control and digital data at various rates. The Army's long-term intention is to develop a standard vehicle electrical/electronic system that can be applied to a wide range of vehicles from trucks to tanks.

Following the concept design, a brassboard model of the electronic system will be assembled and used to demonstrate and evaluate the performance of the Land Systems concept. A single contract, to be awarded to the one of the four current contract winners judged best by the Army, will call for application of the architecture to several vehicles and then for a series of vehicle tests.

Land Systems' commitment to work in vetronics started with a study contract awarded by the U.S. Army Tank-Automotive Command shortly after formation of the Engineering Laboratories in 1982.

GENERAL DYNAMICS

# World

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## Machinist Aaron McGinty Will Represent the U.S. in Skill Olympics



Aaron McGinty

Aaron McGinty, an 18-year-old tool and die apprentice at Pomona, will represent the United States at the International Skill Olympics to be held in Osaka, Japan, next October. This marks the second consecutive Olympics in which the U.S. will be represented by a Pomona machinist.

McGinty placed first in the recent U.S. precision machining trials in Ohio, sponsored by the Vocational Industrial Clubs of America (VICA).

Earlier this year, McGinty became the nation's number one young machinist by winning the gold medal at the U.S. Skill Olympics in Kentucky. The victory there entitled him to participate in the Ohio trials, where he competed against the four top finishers from the 1984 and 1983 U.S. competitions.

Anthony Dechellis of Odessa, Del., and John Mihovitz of Fredericksburg, Va., the second- and third-place winners in precision machining in the Ohio contest, were offered jobs at Pomona and have accepted. They also will compete at Osaka. While working at the division, McGinty, Dechellis and Mihovitz will receive extensive training in machining and metrics in preparation for the International Skill Olympics.

In 1983, Dan Rojas, another Pomona machinist, participated in the international contest in Austria and placed sixth, the highest ever recorded by a U.S. representative. He had previously won the U.S. contest and then went on to win the trials, qualifying him to compete in Austria.

## Pomona Design Engineer Is Careers Goodwill Ambassador

Her job title is Senior Design Engineer, but Pomona's Eva Pantoja could also be called a goodwill ambassador: she is dedicated to helping others and spends a great deal of her free time working to improve career opportunities for women and Hispanics.

Pantoja, who joined General Dynamics one year ago in the Electro-Optical and Electro-Mechanical Engineering Department in East Valley, serves as organizer and current President of the Greater Los Angeles Chapter of the Society of Hispanic Professional Engineers. In that position, she spends much of her own time promoting engineering as a career.

Pantoja recently was a lecturer and teacher during two one-week sessions entitled "Exploring Engineering" for girls in their junior year of high school. The sessions were planned and sponsored by California Polytechnic University, Pomona, and were held on campus, with 25 girls staying in a dormitory for each session.

"The girls were recruited for the experience by teachers

in their respective high schools," Pantoja said. "They observed college life first hand for seven full days, with classes in the morning, tours or lectures in the afternoons and films and group discussions in the evenings."

When the university approached General Dynamics for assistance with the idea, Pantoja's supervisor, Scott Gordon, recommended her because of her heritage, her experience, her interest in the project and her job knowledge.

She was one of the organizers of the pilot program and lectured on mechanical engineering and worked with the students on related projects in the laboratories.

During those two weeks, Pantoja not only worked the 20 hours per week that were contributed by the division, but she also donated her evenings and weekends.

The project is expected to be expanded next summer and the university hopes to process 200 girls through the program, with the help provided by involvement and donations of local industry.



Eva Pantoja

## FB-111 Wing Wins Fairchild Trophy

Fort Worth-built FB-111s of the 380th Bomb Wing, Plattsburgh AFB, N.Y., won the prestigious Fairchild Trophy in the recent 1984 Strategic Air Command (SAC) bombing and navigation competition.

The trophy, which goes to the wing with the best overall effectiveness in the annual competition, has been won by FB-111s in nine of the last 10 years. The 380th Wing has won the trophy five times.

The Fairchild Trophy is named for Gen. Muir S. Fairchild, an aviator who served in both world wars and was Vice Chief of Staff of the Air Force at the time of his death in 1950. Col. George W. Larson, Commander of the 380th Wing, accepted the trophy from Gen. Bennie L. Davis, SAC's Commander in Chief.

Scores in the Fairchild event were based on results of 10 bomber and tanker missions.

More than 30 bombardment, tactical fighter and air refueling units operating eight types of aircraft, including four models of the F-111, were entered this year.



**Earth Station Dish Installed.** Convair's earth station for the Corporation's new Integrated Services Digital Network nears completion as workmen place the satellite dish in place at the Kearny Mesa (Calif.) plant. This earth station will handle all satellite traffic for Convair, Electronics, Datagraphix and the Western Center of Data Systems Division.

## USAF Instructor Pilots Learn to Teach Transition Course to F-16C/D Pilots

Four U.S. Air Force instructor pilots learned the differences between F-16A and F-16C/D cockpit controls and avionics functions during a two-week F-16C/D Pilot Transition Training Course that was conducted at Fort Worth.

The cadre from Luke AFB, Ariz., will pass the information on to others in the service early next year when it begins teaching the first group of pilots scheduled for regular F-16C/D training.

Two additional pilots audited the course, one from Luke and one from MacDill AFB, Fla. These pilots will assist the other instructors in developing the initial USAF Tactical Air Command curriculum.

Completion of the first instructor course brought the F-16C that much closer to its initial Air Force activation, which is taking place this month at Luke.

"The course also marked the first time the division has had a contract which includes flying training," said Lee Long of the Training Requirements section of the Engineering Department. "Although we've always helped the customer determine what aircraft and systems information is needed in their aircrew training programs, most of the formal courses the division has taught before have centered on maintenance procedures."

The pilots spent one week of instruction going over material in a classroom and using a General Dynamics-developed interactive videodisc training system to get their first experience with the new avionics controls and displays. In the second week, the pilots received additional hands-on training by "flying" the F-16C simulator in Fort Worth's Flight Simulation Facility. The course concluded with a training flight for each pilot in the second production F-16D.

The classroom phase was taught by George Zizzo of the Avionic Systems Design group, who was involved in the development of F-16C/D cockpit mechanization. The simulator and flight phases were led by company test pilot John Fergione, who made many of the evaluation flights while F-16C/D systems were being developed. Dave Thigpen, Training Program Manager, also assisted the pilots in the simulator phase.

Zizzo said the pilots are the first from the Air Force who have been associated with the new-generation F-16C/D in a capacity that is not related to its design evolution. "Their concern is 'What can I do with this airplane?'" he said. "Their reaction to most of the enhanced or new capabilities has been enthusiastic."

A cadre of instructor pilots from Shaw AFB, S.C., is scheduled to take the course at Fort Worth in 1985.

## Construction Begins on Turkish F-16 Plant

A ceremony was recently held on Turkey's Muratlı Plains, near Ankara, to mark the beginning of construction of the TUSAS Aerospace Aircraft Factory.

TUSAS Aerospace Industries, Inc., a company jointly owned by General Dynamics and TUSAS, a Turkish firm, will manufacture F-16s at the site near Muratlı Air Base for the Turkish Air Force. The ceremony was attended by Turkish President Kenan Evren, Prime Minister Turgut Ozal and a number of other high-ranking Turkish Government, military and industry officials, including the Chief of the General Staff and the members of the Military Staff.

General Dynamics was represented by Richard E. Adams, Executive Vice President-Aerospace; George A. Sawyer, Executive Vice President-Land Systems and International; Jerry R. Jones, Fort Worth Vice President-Turkey Joint Venture and Deputy Board Chairman of the new firm, and W.B. Zimmerman, Program Director-

F-16 Turkey.

President Evren officially launched construction of the factory by activating a machine to lay the first cement for the foundation.

The President praised the advances which the new establishment will bring to Turkish industrial capability. "It has not been easy to reach this level of technology," he said. "During the 1960s, we were still asking ourselves whether we could build cars or not. As can be observed, we did succeed."

"Our nation will feel very happy to see those planes flying across our skies in the near future," the President continued. He said the F-16s will play an important role in Turkey's quest to "keep our lands for ourselves, forever."

Turkey has agreed to purchase 160 F-16s, with the first eight to be delivered from Fort Worth. The first aircraft to be coproduced by TUSAS Aerospace Industries, Inc., is scheduled for delivery to the country's air force in 1988.